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APRIL, 1924

COMMUNICATIONS

ON COLOUR-RINGS, DRUAULT'S TEST, AND LENS-DISTURBANCE

BY

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THIS paper is mainly an epitome of articles on colour-rings by other writers, and is written to draw attention to a useful differential test that has not yet been described in this journal. My own experience of a colour-ring is added because I think the lental changes on which the ring depends were probably promoted by a pressure-experiment on the eye, and that the record may perhaps be useful as a warning.

So long ago as 1898, A. Druault,[1] working under the direction of Tscherning at the Sorbonne, defined the characters of the colour-ring that depends on the fibres of the lens, and showed a simple means of distinguishing it from the well-known glaucoma-ring. At the Utrecht Congress of 1899[2] he carried the matter further, showing the various causes of colour-rings, their size in relation to that of the obstacles that cause them, and the differential test for the lental ring.

Probably because the lental ring is frequently physiological, and, though often discoverable when carefully looked for, is seldom noticed otherwise, Druault's test seems to have attracted little notice for many years. In seven leading text-books of Ophthalmology, English, American, and German, published since

he first wrote, I find no mention of it. Of late it has been practically rediscovered. Morax[3] referred to it in his work on glaucoma in 1921. Elliot[4] thereupon recognized its importance, and at his suggestion experiments on the subject were undertaken by H. H. Emsley, B.Sc.[5] and E. F. Fincham, of the Northampton Polytechnic Institute, Clerkenwell. Their results are given in a valuable paper in the Transactions of the Optical Society, and, in so far as they cover the same ground, they confirm Druault's in all respects. Elliot[6] has since discussed the subject fully from the clinical point of view. Later still Druault[7] has extended his earlier investigation.

The appearance of a ring of rainbow colours round a light is due to *diffraction*—that "slight tendency to bend round corners," exhibited by light-waves "when part of a wave-front is intercepted by one or more opaque obstacles." The explanation must be sought in a treatise on light, e.g. Edser's "Light for Students"[8] from which I have just quoted; only the more prominent phenomena concern us here. In studying diffraction artificial obstacles—*gratings* of different kinds—are placed before the eye while it views a small bright light, and by comparing the appearances so produced with those which are seen by certain eyes without a grating, the nature of the obstacles existing in the latter is inferred.

A grating in which the obstacles are parallel straight lines all running in one direction, diffracts the light only in a direction perpendicular to the lines; thus lines standing vertically before the eye diffract the light horizontally; and in so doing they break it up into its constituent colours and so produce a narrow spectrum on each side of the central light, on a level with it and at a distance from it, the violet being towards the light, the red away from it. It follows that when the obstacles are bundles of parallel straight lines distributed in all directions like the spokes of a wheel, light is diffracted in all directions, and the innumerable narrow spectra combine to form a colour-ring round the central light and at a distance from it, the colours being placed as just stated. Under certain conditions normal and abnormal, and especially when the pupil is large, the fibres of the lens act in this way.

In such a case let a screen pass slowly before the eye, its edge being vertical (Fig. 1). So long as at least one-half of the pupil remains uncovered, the entering light will fall on fibre-bundles running in all directions, and the colour-ring will remain entire; but when more than half is covered the light will strike no vertical fibres and will no longer be diffracted horizontally; the sides of the ring will, therefore, begin to disappear. When little of the pupil remains free, the light that still enters will fall only on fibres that are nearly horizontal, and will be diffracted only in directions

nearly vertical; hence only small portions of the ring above and below will remain. *The ring disappears in segments.*

Instead of such a screen one may use an opaque strip narrower than the pupil; this, when held in a median position, will allow light to enter at both sides of the pupil; or one may conveniently employ a narrow slit-like aperture, as suggested by Emsley; or a small round aperture may be placed over different parts of the pupil in succession. Different screens have different effects, as shown in various published illustrations, but the principle is the same for all: the fibre-bundles that are hidden from the light diffract no light, and the segments of the ring that depend upon them disappear. A colour-ring that behaves in this way under the

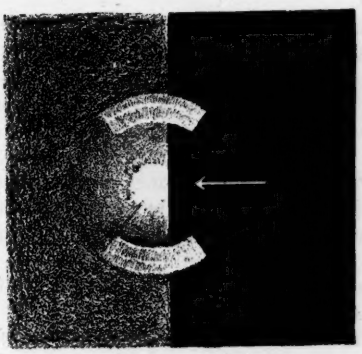

FIG. 1.

Segments of a lental diffraction-ring remaining when more than one-half of the pupil is covered. The arrow shows the direction in which the screen travels. (Reproduced from Druault—1898.)

screen-test certainly depends on the lens-fibres, for it can only depend on linear obstacles arranged radially, and the lens-fibres are the only obstacles of that kind in the media of the eye.

On the other hand a grating that presents numerous rounded particles, e.g. a glass plate strewn with lycopodium spores, produces a colour-ring in a different way. Each particle, by reason of its form, diffracts in all directions; the spectrum due to a single particle is too feeble to be visible, but the joint effect is a brilliant spectral ring. A ring thus produced behaves differently when screened: *it fades gradually as the screen covers more and more of the pupil; it does not disappear in segments; so long as it is visible it is entire,* for any light still entering the pupil meets with obstacles that diffract it in all directions. That is what happens when a glaucoma-ring is tested with a screen.

What are the obstacles that cause the glaucoma-ring? Every fibre, cell, and nucleus in the media of the eye that differs in the least from its surroundings in refractive index or transparency is theoretically a diffracting body; in reality the spectra, if any, so caused are usually so feeble, or so far abolished by over-lapping, as to be invisible. To ascertain what are the bodies that do occasionally induce visible spectra two methods have been adopted. The size of the visible rings has been compared with the calculated size of the rings which would be formed by the various fibres and cells in the media if they became effective as diffracting bodies; and the structural layers of the media have as far as possible been examined separately for evidence of visible diffraction. Something must be said about these methods before the results are stated.

The diameter of a ring may be measured in different ways. One may place the light at a given distance from the eye and measure the ring obtained, or one may vary the distance until a ring of given size is obtained and then measure the distance. In either case the essential magnitudes are the working distance and the diameter of the ring at that distance.

Druault selects the yellow zone for measurement because, though less obvious in colour, it is narrower than the others and its position between the red and green is determined more easily than the outer or inner margin of the whole ring. Elliot's measurements refer to the outer edge of the red. The radius of the ring is measured from the central light by means of a scale or pointer. A metal screen admitting the chief light through a round aperture, and admitting a feebler light through a smaller aperture at a fixed distance from the first, as indicator for the position of the selected zone when the eye stands at the requisite distance, has been employed in laboratory work.

Difficulty in measuring a colour-ring may arise through inability of the eye to define the scale or pointer clearly. In my own case the lental disturbance multiplies the image of the pointer and renders its position on the spectrum uncertain, and the following method answers better:—Two lighted candles are placed at a measured distance from the eye; the distance between them is adjusted until the yellow zones of the two rings appear to blend at the half-way point; the candles are then blown out and the distance between their wicks is measured. This gives the diameter of the yellow zone. The change of colour when the two rings overlap aids in the adjustment, for when the red is intensified one knows that the flames are slightly too far apart; when the green brightens, they are too near; when the pale yellow band between them is at its best, the yellows are blended. The rough instrument shown in Fig. 2 helps considerably in my own case, and should

measurements of colour-rings prove valuable clinically, in connection with the progress of a glaucoma or in any other way, such an instrument furnished with very small electric lamps instead of candles, and marked in degrees and tenths (intervals of 6 minutes) would be found, I think, to work conveniently and quickly.

The size of a colour-ring is best stated in degrees and minutes, for it then holds good for all distances, whereas the linear measurement varies with the distance. But the minutes, however carefully worked out from the linear measurement, must remain doubtful, for an error of 1 mm. in measuring the diameter at 1 metre means an angular error of about 3.5 minutes; an error of

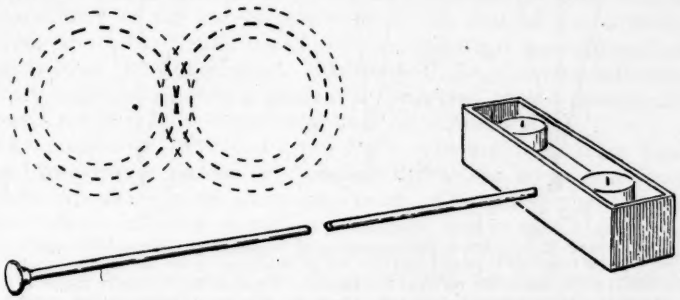

FIG. 2.

When the knob is held to the cheek close below the eye, the candles (Price's night-lights) are 1 metre from the eye. They are movable in the cross-piece, and their distance from each other is measured when the yellow zones blend. To keep their distance from the eye correctly they should move in an arc of a circle instead of in a straight line, but the angles in question are so small that the results would not be appreciably different.

2 mm. at twice that distance means the same, and so on; and larger errors than these are likely to occur. Druault puts the uncertainty at 5 to 10 minutes. It can be lessened by using monochromatic light.

The angular size of a colour-ring is seen at once if one measures with a tangent scale; but it is easily found from a linear measurement. The radius of the ring, divided by the distance between eye and light, is the "tangent" of half the angle required; a table of tangents will show the corresponding number of degrees, and by doubling this we have the angle required. But without help of a table, if working at 1 metre distance, one finds the angle approximately by dividing the diameter of the ring in mm. by 17.5; if working at 2 metres the divisor must be doubled, and so on. The error incurred is much smaller than those that easily

arise in measuring the radius or diameter and is therefore unimportant. (See Figs. 3 and 4.)

For comparison with actual measurements, the size of the diffraction-rings that would be given by the various cellular and fibrous layers of the media, if they gave any, has been calculated from the following facts. The angular dimension of a diffraction-ring is determined primarily by the wave-lengths of light, the

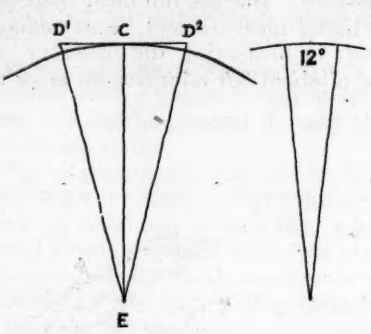

FIG. 3.

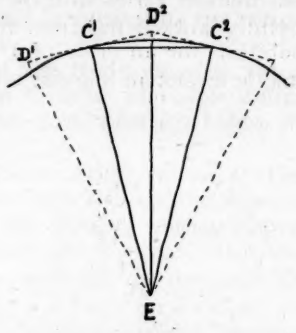

FIG. 4.

FIG. 3—*one light*. Let E be the position of the eye, and C that of the candle at 1 metre from the eye; and let D^1D^2 be the diameter of the colour-ring; then D^1ED^2 is the angle that we want to measure. On a circle of 1 metre radius 1° measures (approximately) 17.5 mm, hence the number of degrees in an arc of that circle may be found by dividing its length by 17.5. But in the case of a small angle, the straight tangential line D^1D^2 is so nearly equal to the corresponding arc in length, that it may be substituted for it; thus if we measure the angle by dividing the diameter of the ring by 17.5, the error will be an over-estimate of about 2.5 minutes for an angle of 12°, and of about 1 minute for an angle of 6°.

FIG. 4—*two lights*. Let E. be the position of the eye as before, and C^1 and C^2, each at 1 metre from E, the positions of the candles when the yellow zones blend. Since the working distance is the same as in the previous case, the diameters of the colour-rings D^1D^2, and the corresponding angles, $D^1E\ D^2$, are equal in the two cases; and since the angle $C^1E\ C^2$ equals the angle $D^1E\ D^2$ we may measure it instead of the latter. Now if we substitute the chord C^1C^2 for the corresponding arc we get an error as before, but it is opposite in kind and smaller in amount: dividing the chord by 17.5 we get an under-estimate of about 1.5 minutes for an angle of 12°, and of about 1/3 minute for an angle of 6°.

diameters of the several colour-zones being directly proportional to their wave-lengths, namely greatest for the red, smallest for the violet. It varies inversely with the diameter of the diffracting particles, or with their spacing if linear: the smaller the diameter, or the closer the spacing, the larger the ring. It varies for given obstacles with their position in the eye: the nearer they are to the retina, the smaller is the ring (for formulae and explanatory diagrams, see Druault, 1899 and 1923).

These comparisons, together with Druault's test and certain

direct experiments, have left little doubt as to which are the parts that cause the best-known colour-rings.

The vitreous has been suspected, but apparently without good reason. Koeppe[9] attributes the glaucoma-ring to a certain arrangement of the stroma. Druault cites evidence against such an arrangement, and shows that even if it existed and produced a diffraction-ring under pressure, the latter would be very much smaller than the glaucoma-ring. W. Nordenson[10] has attacked the question by experiment. Having trephined the back of an ox-eye and closed the 11 mm. aperture with a conical glass plug, he placed the eye in a suitable support, directed it vertically downwards over an adjustable lamp, and viewed the media under varying pressure and illumination. Under increase of pressure the transparency of the cornea diminished, but that of the vitreous, as judged by the definition of the free iris-edge seen through it from behind, was unaffected. Portions of the vitreous subjected to very high pressure in a glass cell connected with a manometer showed no loss of transparency and no diffraction.

The lens-fibres, removed from their surroundings, have been found to produce partial or complete diffraction rings according to their directions in the parts examined. The arrangement of the fibres differs somewhat in man and animals, and in man at different ages. In the ox, the central area of the lens gives six equidistant segments of a colour-ring, not an entire ring, for the grouping of the fibres is tripartite, nearly as in the human foetus at six months. In the adult human lens the bundles are more nearly radial and, therefore, produce a complete ring, but the central area gives no visible diffraction: a round aperture of 3 mm. or less before the centre of the pupil banishes the ring. Sections of the lens 0.5 mm. in thickness give visible diffraction; thinner sections do so only when the fibres have been defined by staining.

The ring caused by the lens-fibres is seen by the majority of healthy eyes if carefully tested after dilatation of the pupil, and for this purpose cocain is sufficient. It measures 6° to 7°. It is less brilliant than the glaucoma-ring. Because of the peculiar arrangement of the fibre-bundles, it varies in brightness at different parts of the circle, and is somewhat striate in appearance and notched at the edges; for the same reason the axes of the segments that remain when the screen is used are often slightly oblique in relation to the edge of the screen.

The epithelium of the lens when separated from the fibres and stained gave, in certain preparations from the calf, well-marked diffraction rings, but without staining it gave none (Mme. Druault-Toufesco[7]).

The endothelium of the cornea. Following a method previously used by Schiötz[11], Druault experimented on human corneae

removed with a ring of sclera and fixed without distortion in a cylindrical box filled with normal saline. Through glass windows in the ends of the box and through the contained cornea immersed in fluid, he viewed the source of light. The intact cornea gave a diffraction-ring of about 4° (yellow zone); when the epithelium was removed by scraping, the ring persisted, but when the endothelium was removed it disappeared. Its size was approximately that which, according to calculation, these cells should give. Druault identifies it with a physiological ring discovered by Tscherning; it was not the glaucoma-ring.

The epithelium of the cornea. Fuchs[12] discovered long ago that in glaucomatous eyes the anterior-fibre-layers of the cornea become oedematous, and that particles of fluid pass along the nerve-canals in Bowman's membrane and collect beneath and between the epithelial cells lying immediately on it. Schiötz[11] shortly afterwards, experimenting on human corneae with the apparatus mentioned above, saw in the absence of pressure a ring of about 4°, apparently the ring which Druault attributes to the endothelium of the cornea; and when the pressure behind the cornea was raised to a certain height, a second ring about twice as large as the first. This larger ring of about 8°, he held to be a diffraction-ring due to the basal cells of the corneal epithelium; measurements of glaucoma-rings tend on the whole to confirm that view.

Laqueur[13] measured many such rings and recorded 10° to 11° as the usual size for the outer edge of the red zone, which would be about 8° to 9° for the yellow; Druault measured four, and found 8° to 9° (yellow) in all of them; Emsley and Fincham measured two, and found 6° to 7° (yellow) in both; while I am writing my son has measured one at my request and found 7.7°; Elliot, among a larger number, found greater variation, namely from about 7° to about 12° (outer edge of ring, which appeared to differ in colour in different cases). Other measurements are on record, some of them differing surprisingly, but not having direct access to them, and being uncertain as to the zone measured, I omit them.

The glaucoma-ring, then, is in all probability due to slight oedema at the surface of Bowman's membrane, but whether the cells or the particles of fluid beneath them are the diffracting bodies seems doubtful. To explain a difference in the size of the ring in different persons, and in the same person at different times (Elliot), one may suppose the oedema to extend by degrees from the basal cells to the larger ones nearer to the surface; or one may attribute it to gradual increase in the size of the droplets of fluid, though it is difficult to imagine these latter to remain sufficiently alike in size to give a well-defined diffraction-ring; in either case the ring should diminish in size as the oedema increases, and

enlarge as the attack passes off; observations on that point would be interesting. It is noteworthy, I think, that a colour-ring is not immediately producible by finger-pressure on a healthy eye, though the rise of the chamber-pressure so induced may be much greater than that which accompanies the appearance of a glaucoma-ring. This suggests that an eye threatened with glaucoma is already suffering from slowing of the circulation and incipient oedema of the cornea before the colour-ring appears.

Particles on the surface of the cornea. Blood corpuscles on the cornea give a brilliant diffraction-ring, as may be easily proved by placing a drop of blood on the inner surface of one's lower eyelid; the ring measures nearly 14°. Pus corpuscles have been seen to produce a similar ring immediately after the opening of a small abcess at the edge of the eyelid. Again, leucocytes or fatty particles on the cornea are probably responsible for the rings that sometimes occur with conjunctivitis, and after sleep. Minute air-bubbles produced by the rubbing of mucous between eye and lid are suggested as a possible cause by Elliot; he has found that such bubbles are easily obtained by rubbing a film of white of egg between two glass slides, and that they give diffraction phenomena. All such colour-rings are at once banished by cleansing the surface of the cornea, and are thereby distinguished from those that are due to obstacles below the surface.

Personal experience. Early in 1920, at age 74, I saw one evening an unmistakable rainbow-ring with my *right* eye; I had never seen such a ring before and was not looking for it. The circumstances were unusual. Owing to gas-repairs two candles on a central table were the only lights in the room, and I was tired with gardening and may have had larger pupils than usual. It is likely that the ring would have been seen earlier if looked for under similar conditions. Knowing that the eye had altered in focus of late, I judged the ring to be lental and was satisfied on that point during the next day or two by finding that it was always present when properly looked for, and never associated with discomfort, injection of the eye, or inequality of the pupils. The screen test would have settled the question in a few seconds at the outset, but I have to confess that though Druault's articles had been read when they appeared and were on my shelf, they were forgotten until Elliot's reference to the screen-test recalled them to my mind. Since first seen the ring has always been visible when I choose to look for it.

Characters of the ring. It is best seen with a single small moderately bright light, all surrounding surfaces being in comparative darkness, e.g. a lucifer match at arm's length, a candle at a few feet with a dark curtain at some considerable distance

behind it, or a lamp of medium brightness out of doors at night. It shows, from without inwards, zones of red, faint yellow, green, and sometimes feebly-seen blue, all without sharp limits. It is best measured by the two-light method described above, for when a single light and pointer are used, the image of the latter is blurred to the naked eye, and the size of the ring is altered by the correcting glass. The yellow zone subtends 6°.

The brightness of the ring varies with the size of the pupil, and sometimes in an unexpected way. Thus, I have noticed several times, and at first with surprise, that on going from a well-lighted room into the comparative darkness of a moon-lit garden, the colour-ring round the moon, at first quite brilliant, soon appears to pale; the explanation is that for the first few moments the retina is still adapted for strong light and consequently the pupil dilates to give as much light as possible (the stimulus to contraction is feeble); then, as the retina adapts itself to the feebler light, the stimulus increases and the pupil returns more nearly to its ordinary size; more of the lens is now covered, and the diffraction-ring tends to disappear. Experimental dilatation of the pupil to 6 mm. by cocain increases the brightness of the ring but does not alter it in any other way. Subsequent contraction to less than the usual size by pilocarpin abolishes the ring entirely for several hours—an effect which might mislead an examiner if the lental origin of a ring had not been already proved by Druault's test. A stenopaic screen with aperture of 2 mm. placed centrally before the pupil banishes the ring entirely.

Under the screen-test the ring disappears in segments in the way already described; Fig. 1 might have been drawn from what my right eye sees except that the segments are not so sharply defined as in the picture, and that the central light is multiplied. Whatever form of screen be used—a straight-edged shutter, a narrow bar, a slit, or a small round aperture—I find it convenient to adapt it to the trial frame; by very small movements of the head one can then vary its relation to the pupil steadily and with great precision.

Under no conditions have I been able to see the slightest sign of a colour-ring with the *left* eye—not even when the pupil was similarly dilated to 6 mm. by cocain.

Condition of the eyes. Formerly the two eyes were equally good. Each had compound myopic astigmatism of low degree, the maximum error hardly ever reaching—1 D, and diminishing as age advanced; each had V 5/4 and sometimes 5/3. Definite inequality was first recorded at age 71 (November, 1916: R.E. —1., V 5/4; L.E. —0.5 cyl. at 60°, V 5/4), but may have been present some months earlier. Since that time the *right* has gradually acquired a considerable myopia while the *left* has remained almost unchanged: (February, 1924: R.E. —7. and

—1.5 cyl. at 45°, V 5/7 partly; L.E.: —0.37 and —0.87 cyl. at 55°, V 5/3 partly).

Together with the myopia the *right* eye has acquired a well-marked polyopia for small bright lights. Fig. 5 is an attempt to show the appearance at 1 metre distance, of a 5 mm. aperture in a metal screen placed close in front of a candle-lamp; it was made by affixing white gummed labels to a black card. At greater distances each disc is broken up into many small lights. A bicycle lamp at 20 or 30 yards presents a multitude of tiny lights forming a bright ring round an unbroken dark area. On a dark night an approaching troop of cyclists, themselves invisible but each bearing such a ring, affords a spectacle that is very attractive though not to be desired.

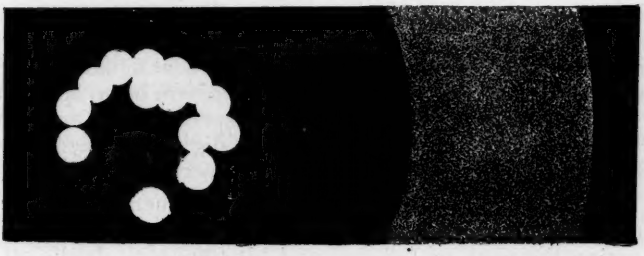

FIG. 5.

Appearance of a circular disc of light 5 mm. in diameter, as seen at 1 metre distance by the *right* eye. The contours of the multiple images in the picture are somewhat too sharp, especially at the lower part of the group. The correcting glass abolishes the polyopia almost completely and gives a fairly good picture of the disc of light.

The *left* eye sees the 5 mm. disc of light perfectly, and when made as myopic as the right by means of a convex lens, it sees it as a circular diffusion-area with no dark centre but uniformly occupied throughout by faintly distinguishable contiguous bright images of the disc. When *both* eyes are open, the single true image of a light is seen within the ring of multiple scattered images, and about at its centre.

Examined by Mr. Wilfrid Allport and my son, the *right* lens shows a centrally placed, deeply seated, hazy patch, not sharply defined and not dense enough to hide the red of the fundus; around this it is clearer and permits a fairly good view of the disc; towards the periphery it is clear except at the lower part of the circle, where there is a denser fan-shaped opacity. The *left* lens shows slight peripheral striae such as are usual at this time of life.

The entoptic picture corresponds. Looking towards the sky through a very small pin-hole, the *right* eye sees a central brown

patch shaped somewhat like the central area in Fig. 5, and a fan-like opacity approaching it from below.

A result of experimental pressure? These changes, of course, may be merely those of ordinary senile cataract with no unusual origin; I suspect, however, that they were promoted if not started by finger-pressure on the eye. In 1917, when studying retinal blood-pressure, I made the well-known experiment of stopping the retinal circulation by finger-pressure on the eye. Using a candle flame as fixation object, and placing the right middle finger on the right lower eyelid, I made pressure on the eye until the visual field, including the image of the candle, was momentarily abolished; I think this was done more than once. (I found, as I had done years earlier, that one cannot in this way obtain a partial or gradual contraction of the field, as some have said, but that it vanishes as a whole, except at the fixation-point where it is more persistent than elsewhere.) No pain occurred, no change was noted afterwards, and I did not think of the experiment again until some months later when a very noticeable development of myopia in this eye set me wondering; I then began to suspect that the experiment was to some extent responsible, though a slight difference between the eyes was already present before the experiment was made.

I know of no evidence to show that experimental pressure on the eye has done damage, but the idea is not a new one. Elliot[14], discussing the work of Bailliart and his followers, dwells on the risk of haemorrhage. I think that in advanced life the risk of damaging the lens is quite as great. Foerster's method of ripening a cataract proved to those of us who tried it that moderate disturbance of a lens that is beginning to degenerate will sometimes greatly quicken the process; and even in a senile lens that still seems functionally perfect the growth of the fibres is slackened, and the bundles at the periphery are tending to separate from each other, and are likely to do so under any deforming pressure. In early life the risk is doubtless smaller, as my own experience seems to show.

In 1878, when first studying certain glaucoma problems[15], I made an apparatus that enabled me to experiment accurately on my own right eye. Pressure was applied through the lower lid by a flat ivory knob 5 mm. in diameter in an upward direction towards the centre of the globe, and on at least one occasion it was loaded up to 100 grammes. That experiment did no harm, but in reporting it I gave a caution:—"It should not be incautiously repeated. I judged the safety . . . by the sensation of my eye, and felt nothing to be called pain even with the great weight of 100 grammes (=3 ounces about); but I did not consider the danger involved in such extreme distortion of the surface near to the lens."

That was in the fourth decade of life; in the eighth, when the risk was greater, I forgot my own warning.

The changes in the lens afford no proof, but at least they are consistent with my suspicion. The chief opacity lies in the lower part of the lens, where the pressure of the finger would be likely to take chief effect. The deeply seated hazy patch indicates disturbance of the posterior cortical layers, and explains the central dark area in the retinal picture (Fig. 5). The multiple images are produced by a surrounding zone which, though comparatively clear, has suffered sectorial disturbance. The myopia of this zone must be due either to a change of density in the nucleus—which is unlikely, for there is no such change in the fellow eye—or to a change of form, possibly promoted by stretching of the suspensory ligament; we know that the attachment of the lens to its surroundings, both behind and at its periphery, weakens as life advances. The complete absence of a colour-ring and the nearly complete absence of refractive change in the *left* eye, in spite of peripheral striae, suggest an additional factor for these changes in the *right*.

At this time of life, the other eye being excellent, these changes are of small importance; to me, so far, their interest has been far greater than their inconvenience; moreover the suspicion I have spoken of is not unwelcome for it betters the prospect for the other eye; but one can imagine cases in which a similar sequence might give rise to grave concern. It is for this reason that I have put my experience on record.

I am much indebted to Mr. Lawford, Professor Schiötz, Col. Elliot, and Dr. W. Nordenson for enabling me to read certain articles referred to in this paper, and to Dr. Barlow of the Birmingham University for examining it with regard to questions of physics.

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LACRYMAL PASSAGES IN THE GUINEA-PIG AND RABBIT

BY

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THE guinea-pig and the rabbit are extensively used in experiments in which in the first place it is necessary to pay attention to the anatomical conditions peculiar in these two animals. Even in ophthalmology guinea-pigs and rabbits are used to a great extent when experimentally studying various problems, and thus it is not without importance for us to familiarize ourselves with their anatomical structure, the more so, as the hitherto published data are inaccurate, and, being of a general nature, apply to whole animal groups, and do not regard the requirements of practice. The anatomy of the lacrymal passages in the rabbit and the guinea-pig constitutes one of little known departments.

In comparative anatomy we find only general data relative to this subject, the rabbit being a rare exception at best, for, with regard to it, scant and scattered information may be found in current literature. Wallsberg[1] has pointed out that in the rabbit, the pig, and the sheep, the lacrymal passages commence with one lacrymal punctum, but in other domestic mammals with two puncta, exactly as in man. Ellenberger[2], in his "Comparative Anatomy of Domestic Animals," says that lacrymal passages commence with lacrymal canaliculi beginning in the punctum lacrimale; the canaliculi lie at the bottom of the lacus lacrimalis in the inner canthus, and not, as in man, at the top of the papillae, but at a definite distance from the margin of the upper and the lower lid in the conjunctiva respectively. In the sheep the superior lacrymal canaliculus may be altogether absent; both canaliculi converge in a slight curve downward and enter into the lacrymal sac situated under the caruncle. The sac in the domestic animals is either very indistinctly defined, or is altogether absent. A. Chauveau[3] and S. Arloing state that, according to Charles Vogt and Emil Jung, the rabbit possesses only one lacrymal punctum a few millimetres distant from the edge of the lower lid (*loc. cit.* Vol. II. p. 665). Schirmer[4] treats only of the anatomical structure in man, and makes no mention of the guinea-pig or of the rabbit. The most detailed treatment of lacrymal passages in the rabbit is that by Dr. W. Krause in his book "Anatomie des Kaninchens."

But the above descriptions do not exhaust the subject, and are too insufficient for an experimenter interested in the pathological physiology of the conjunctival sac, and of the lacrymal passages.

Regarding the guinea-pig no particular data whatsoever are available. Hence, when I intended to inquire into the question of permeability to tubercle bacilli of the conjunctiva, I was compelled to acquaint myself minutely by autopsy with the anatomy and physiology of the lacrymal passages in guinea-pigs and rabbits. Here I submit a brief account of my results in order to draw attention to possible errors, and to facilitate future investigations in this direction.

The guinea-pig has two lacrymal puncta which, however, are not situated on the papillae of the lid margin, but on the conjunctival side of the skin of the inner canthus where the skin

FIG. 1.

Lacrymal region of the guinea-pig.

passes into a rudimentary caruncle, 1 mm. away from the free margin. Here we can find lacrymal puncta as apertures not larger than dust flakes, and situated close above and under the horizontal meridian of the orbit, about 0.75 mm. apart. Lacrymal puncta can be best located in pigmented guinea-pigs in which they are situated in the indicated place exactly on the boundary where on the conjunctival side of the skin of the inner canthus the boundary of the skin pigment ceases; in such cases it is sometimes possible to probe the lacrymal puncta with a delicate wire. Otherwise it is possible to probe only from the lacrymal sac. If we make a deep vertical incision reaching the bone, at a distance of 1 mm. from the inner canthus, the lacrymal canaliculi will appear on the section as two apertures that are bordered with pigment in pigmented animals. From here we can probe with a delicate wire to the lacrymal puncta, and to the sac. In this way it is possible

to find that the lacrymal canaliculi, which are 2.5 mm. long, trace a slight curve, and in pigmented guinea-pigs are pigmented along their entire course. The arches of the canaliculi converge and finally meet in the lacrymal sac, marked with a fairly thick wall, and a lumen about 0.75 mm. wide.

The lacrymal region exhibits an organization quite different from that in man, due to the different shape of the orbit. The orbit of the guinea-pig is open downward, its roof is formed by the frontal bone, and the internal sagittal wall is derived from the

FIG. 2.

Passage and mouth of nasolacrymal duct in the guinea-pig.

maxilla; the posterior wall is represented by the ala magna ossis pterygoidei and by the squama temporalis, the anterior wall consisting of the lamina papyracea ossis ethmoidalis, and of the os lacrimale. The lacrymal bone is comparatively very large and strong, resembling in shape a pyramid with the point turned toward the jugal bone, and base toward the os frontale and lamina papyracea; its inferior face is free exactly liké the posterior face which is turned into the orbit, and at the centre shows an aperture 0.5-1 mm. wide. Under the skin the lacrymal bone can be felt with the finger fairly distinctly, for its orbital edge is sufficiently sharp above, being at its inferior end terminated with a similar process.

The ductus naso-lacrimalis passes through an opening in the lacrymal bone, and enters into the nasal cavity where it extends along the lateral wall of the maxilla which, in its posterior half, is slightly caved in, with the result that the canal in its course imitates somewhat the shape of the letter S. The duct passes at an angle of about 30° through a delicate bony canal, first under the concha media, then, after it has passed on to the os intermaxillare, below the concha inferior. In the same way as in rabbits, the duct terminates anterior to the concha inferior, and under the point of its greatest convexity, 4 mm. from the posterior wall of the spina nasalis, and about 6 mm. from the nostrils, under the

FIG. 3.

Lacrymal region of a rabbit.

lower boundary of which the duct lies 0.5 – 2 mm. The entire length of the ducts amounts to 14—15 mm. from entrance into the nose down to its termination, and its average lumen amounts to 0.25 mm.

The permeability of the lacrymal passages in the guinea-pig can be tested with some stain in solution, the most suitable for the purpose being fluorescein or dissolved methylene blue, e.g. 10 drops of Löffler's solution in 5 cm. water. I administered methylene blue to a whole series of guinea-pigs so that the conjunctival sac was always full of the stained solution in order to determine if the mucous membrane of the nose and the nostril on the same side would colour. In some animals the nostrils

stained fifteen minutes after the first drops had been introduced, in others only half an hour after repeated dropping, while in some cases it was necessary to introduce drops three or four times, and the animals required to be held head downwards, and then only after 45-60 minutes did the nostrils show a blue colour. In a series of normal guinea-pigs it was impossible to obtain a blue colouring of the nostrils even after 1½-3 hours had elapsed, despite the stain being administered every five minutes into the conjunctival sac, and the test facilitated by holding the animals head down, by swinging them to and fro on occasion, and by introducing cotton-wool or sterilized water into their noses. In such animals the nostrils did not stain even after another observation lasting 24 hours, although the lacrymal passages were permeable, as I have ascertained by dissection in seven cases. It is not possible to infer any reduction of methylene blue to indigo white, for the results agreed even after application of fuchsin. Hence, it can be concluded that only a positive result can inform us whether the lacrymal passages of the guinea-pig are permeable. It is sufficient to drop the stain one to four times into the conjunctival sac, and to watch the nostrils for one hour. If they do not colour within that time, it can hardly be expected that they will do so later on. A negative result of the above test does not always signify that the lacrymal passages are impermeable, as even in normal animals of various ages and weights the result of the test may be negative while the passages remain permeable. Possibly, the individual condition of the capillary lacrymal duct of the guinea-pig determines this. In cases where the above test results negatively, there is only one more test available in order to ascertain the permeability of the lacrymal passages, i.e. probing of the lacrymal passages after the animal has been killed.

In experimental research it becomes frequently imperative to render the lacrymal passages impermeable, and to stop the efflux from the conjunctival sac, as when inoculating the cornea, the conjunctival sac, etc. Römer[5] (*loc. cit.*) endeavoured to obtain this result in guinea-pigs by sealing with a galvanocautery the lacrymal puncta, and after the wound had healed he made sure that the efflux on the operated side was shut off: "When I had introduced one or more drops of diluted methylene blue, according to the size of each animal, into the conjunctival sac, no blue colouring of the nasal mucous membrane set in on the operated side, while on the other side, not operated upon, it was possible, within a few seconds, to perceive a bluish coloration of the mucous membrane." This method, however, has proved a failure in my experiments, as the lacrymal puncta of guinea-pigs are hardly perceivable, and thus it is no wonder that our cautery should not reach them. If the mucous membrane of the nose does not colour

on the operated side after instillation of stain into the conjunctival sac, it is not justifiable to infer that the passages are impermeable, for in a normal guinea-pig with permeable passages the nostril very frequently fails to colour, as described above. Hence, this method might lead to erroneous assumptions. The puncta lacrimalia can sometimes be obliterated also by galvanocautery; we first evert the skin of the inner canthus and locate the boundary of the skin pigment on the conjunctival side, and there brand a rather wide furrow vertically intersecting the horizontal meridian of the palpebral fissure and extending 1 mm. in length on either side. In order to obtain a good result from this operation we must first break the continuity of the canaliculi. The animal is anaesthetized by ether, and a deep vertical incision is then made with a sharp knife close to the internal canthus. After drying the wound the two canaliculi are easily found when pigmented guinea-pigs are used. The canaliculi lie in the anterior portion of the section like two black threads extending from the conjunctiva to the lacrymal bone. Their obliteration is best effected by ligature and galvanocautery. The impermeability of the canaliculi is best tested by using a probe.

Rabbits have only one punctum lacrimale situated 2-3 mm. below the edge of the lid at the inferior margin of the membrana nictitans. The punctum is quite wide, 0.5-0.75 mm., and is bordered with a ridge of mucous membrane, opening dorso-laterally into a delicate furrow. The canaliculus is about 0.3 mm wide and extends inward at an angle of about 45°, and somewhat downward at an angle of 30°. It then arrives at the lacrymal ossicle situated at the fronto-maxillary suture close behind the sharp process of the medial margin of the orbit. The length from the punctum to the bony canal approximates 12 mm.

The lacrymal sac is represented only by a moderate dilatation of the duct; its diameter is 2-3 mm., and it lies within the fossa lacrimalis which latter is anteriorly bounded by the crista lacrimalis anterior maxillae, and posteriorly by the crista lacrimalis posterior ossis lacrimalis. The upper wall is formed by the sutura fronto-maxillaris and by a sharp process of the frontal bone which process suddenly springs like a roof from the ventral border of the orbit, so that it can be very distinctly felt with the finger under the skin. The lower wall of the fossa lacrimalis is represented by the lacrymal bone. It is necessary to add that the os lacrimale in rabbits is nearly as thin as paper, and is wedged in between the lamina papyracea ossis ethmoidalis and the processus frontalis maxilla as in man, its margin being free and turning into a fissure frontalis, which here sends off its sharp process mentioned above. At the bottom, however, the os lacrimale does not lodge upon the

maxilla as in man, its margin being free, and turning into a fissure that separates the entire upper edge of the maxilla from the lamina papyracea and from the ala parva ossis sphenoidalis. The position of these structures is contingent on the special shape of the maxilla, the body of which is thrown forward and presents its temporal face backward, so as to help to form the ventral wall of the orbit. For this reason the orbit is open downwards. Thus, the ventral wall of the orbit is divided into an upper and a lower part by a fissure, bounded at the bottom by the rugged edge of the maxilla, and at the top by the os lacrimale, by the lamina papyracea, and by the ala parva ossis sphenoidalis. The fissure opens into the fossa spheno-maxillaris which from the medial side is bounded by the os palatinum. (cf. description by W. Krause[6], *loc. cit.* p. 61.)

The ductus naso-lacrimalis passes through a bony canal, the stronger lateral wall of which is represented by a semi-canal in the wall of the os lacrimale and of the maxilla. The medial wall is formed by a bone as fine as paper. The canal extends in a slight curve about the foramen infraorbitale and maintains an angle of about 30°. In its lower part it passes to the os intermaxillare and extends along its wall above the base of the lower meatus close under the lower concha. The terminal membranous part of the duct turns slightly upwards along the greatest convexity of the lower concha, and opens 8 mm. behind the nostrils of the lower meatus. Thus the mouth of the duct is placed lower than the opening of the nostrils. The lumen of the duct averages 1 mm., the length of the canal amounts to 34 mm., measured from its entrance into the nose to its termination in front below the concha.

The permeability of the lacrymal passages in rabbits can be tested with dissolved stain introduced by drops into the conjunctival sac. If the lacrymal passages are permeable, the homolateral nostril will colour within five minutes. Impermeability can best be obtained by introducing the needle of a delicate cautery into the lacrymal punctum, and then pushing it until it gets right under the lacrymal bone, whereupon the loop is heated red (Römer). It is convenient to add afterwards a cross-stitch, and to draw together the edges of the singed conjunctiva with thread. Some eight to ten days after the defect has healed, a control test can be made to ascertain the impermeability of the lacrymal passages. For that purpose it is sufficient to introduce dissolved stain into the conjunctival sac and watch if the nostril on the same side shows colour. A single drop, however, as generally directed, is not enough. Dropping must be repeated every five minutes, and the time of watching extended to one hour, as in some operated animals the stain will only show on the nostril 30 minutes after repeated dropping from which we can judge that complete obliteration has

not been obtained, but a mere stenosis of the lacrymal passages. It is only in this way that erroneous conclusions can be avoided.

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LUPUS OF THE LACRYMAL SAC

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FUCHS, in his text-book on ophthalmology, states that tuberculosis of the lacrymal sac may occur by extension, either from the conjunctival or nasal mucosa. The following case in which definite evidence of tuberculosis was found in the tissue removed from the nasal mucosa and from the region of the lacrymal sac seems worthy of record.

A female, aged 26 years, attended the eye out-patients under one of us (R.R.J.) at St. George's Hospital in the summer of 1923 for a lacrymal abscess which had burst on the left side; there was a history of epiphora of some weeks duration on each side, but the abscess had only formed on the left side one week before she presented herself for treatment. At this time there was found to be regurgitation from the right sac on pressure over it with the finger; the left side showed a discharging fistula surrounded by a large mass of granulation tissue; apart from this there was a peculiar appearance over the soft parts of the nose on each side. This was shiny, slightly reddened but not ulcerated, and the

terminal part of the nose was slightly swollen and bulbous; the patient stated that her nose had been in this state for about a year. The interior of the nose was not inspected at this time, and expectant treatment was adopted, pressure and the regular use of an astringent lotion for the right side and hot fomentations for the left; later in the year she was admitted for excision of the sac and was seen by L.C. On admission, the fistula was found to be in much the same state as on her first visit and the interior of the nose was found to be completely blocked by large crusts so that no view could be obtained; the Wassermann reaction was reported negative. It was decided to try and clear up the anterior nares before any operation was attempted and after a week's use of a nebula, the inside of the nose was so much improved that it was decided to operate. The diagnosis of lupus was made at the time of operation. Under general anaesthesia, the usual incision was made for removal of the sac; the knife entered a cavity in the region of the sac, the deeper parts of which were found to be full of granulation tissue of the characteristic apple jelly type; these were scraped away with a sharp spoon and a piece of tissue, which appeared to be mucous membrane from the wall of the sac, sent to the laboratory for pathological examination; the wound was covered with B.I.P.P. and was left open. An extensive ulcer was seen in the anterior nares reaching over the outer wall and on to the septum, a piece of this ulcer was removed and sent over for insertion into a guinea-pig; haemorrhage was rather free.

The pathological report was that the tissue removed was full of giant cell systems characteristic of tuberculosis, with added evidence of pyogenic infection.

Ten days later the wound in the region of the sac was treated with the electric cautery which was also passed down the nasal canal, and at the same time the cautery was applied freely to the ulcerating area inside the anterior nares. Since the last operation, the fistulous track in the region of the sac has closed completely and the state of the nose has improved very much; the patient has been sent to her home in the country to recuperate for a month and she has been warned to return at the end of that time for inspection. It is probable that the inside of the nose will have to be cauterized again before the disease is eradicated. At the time of writing, the guinea-pig is fairly well, but it has developed a couple of hard lumps in the left groin, near the site of inoculation; it will be killed later*. In conclusion, we wish to express our thanks to Dr. E. L. Hunt for the report on the animal and to Dr. Robert Donaldson for the pathological report.

* When the animal was killed, it was found to be riddled with tuberculosis.

COUNCIL OF BRITISH OPHTHALMOLOGISTS

Report on Standards of Vision for Candidates for Scholarships and Teacherships under Local Education Authorities

IN the interests of the community and of the individual it is important that scholarships and teacherships should not be granted to candidates suffering from such ocular defects as may be aggravated by long-continued study and lead to inefficiency or incapacity later in life. It is, therefore, advisable to establish, if practicable, standards of vision which shall exclude unsuitable candidates. At the same time standards should not be fixed so high as to exclude any appreciable number who might in practice prove fit.

The average age of entry upon a junior county scholarship is 11 years; the holder is transferred to a secondary school for five years. Supplementary scholarships are awarded at about 13 years of age, and are held for three or four years at a secondary school. Intermediate scholarships are granted at about sixteen for two or three years. Senior county scholarships are granted at the age of 18 years, and are tenable at a university for three or four years. Prospective teachers undergo training at a college between the ages of 17 and 20 years.

The errors of refraction of most importance in reference to education are myopia and high degrees of astigmatism.

Myopia is found in about 10 per cent. of children at the leaving age in elementary schools, and in about 10 per cent. of these myopes it becomes a serious defect; in the remaining 90 per cent. of the myopes the defect causes little inconvenience apart from the necessity for wearing glasses. It is generally agreed that in many persons prolonged near work on fine objects under comparatively poor lighting is a cause of myopia, or aggravates existing myopia, especially when astigmatism is present. If preventive measures are to be initiated, and the selection of individuals likely to become unsuitable for such special duties as teaching is to be avoided, it is necessary to determine at as early an age as possible the unfavourable cases. In elementary schools cases of myopia of considerable degree are found in infants under seven years of age, but the first routine test of vision is not made until the children are about eight years old. Of the cases examined at this age, and sent to clinics, some with diminished visual acuity and considerable myopia are transferred to myope classes; others are ordered glasses and return to school, but usually no sufficient effort is made, either at the clinics or at the schools, to warn parents regarding the future of these children.

At the age of eleven the child either is left to continue his education in the elementary school until fourteen years of age, or goes, frequently by means of a scholarship, to a school giving higher education of a more intensive kind. Successful scholarship candidates are then medically examined, and the first administrative difficulty arises in the elimination of those to be deemed medically unfit.

A child of eleven with 4.5 dioptres of myopia would by most authorities be deemed unfit for a scholarship. He must continue at the ordinary school, or, exceptionally, go to a myope class. A child of this age with 1.5 dioptres of myopia would be deemed fit for a scholarship. Between these limits of 4.5 and 1.5 dioptres of myopia a decision has to be given on many difficult cases. Many young myopes have good visual acuity with correcting glasses, and apparently healthy fundi, yet their defect is often progressive. The determination in all young myopes of the rate of progression is most important. The previous history, however, is often defective. It may be known that the child has worn concave glasses for some time, or, at best, there may be a record that vision was tested at the age of eight and found normal. More accurate records would be of great value, and it is desirable that such should be kept.

Astigmatism of considerable amount may cause want of efficiency, especially in those engaged in an occupation such as teaching, which involves much close or fine work. With very high degrees of this defect, visual acuity, even with correcting glasses, is usually subnormal.

The recommendations of the Council are as follow:—

Visual acuity. In all candidates for scholarships and teacherships visual acuity, with correcting glasses, should be not less than 6/9 in the better eye.

Myopia. A child of eleven with less than two dioptres of myopia should be passed.

A child of eleven with two to three dioptres of myopia in either eye should be passed on probation and re-examined every six months.

A child of eleven with three or more dioptres of myopia in the better eye should be rejected for scholarship training.

At the age of fifteen those with more than four dioptres of myopia in the better eye should be deemed unfit to train for the teaching profession.

Candidates for entry to training colleges, who are, as a rule, about eighteen years of age, if they have more than five dioptres of myopia in the better eye should be rejected.

Astigmatism. Simple myopic astigmatism exceeding three dioptres in the better eye should be a cause of rejection of candidates both for scholarships and for training as teachers. In cases of compound myopic astigmatism, unless the myopia is stationary, astigmatism of even two dioptres may be a cause of rejection.

Cases of hypermetropic astigmatism should be rejected only if visual acuity, with correcting glasses, in the better eye is less than 6/9.

Hypermetropia. This defect should not be a cause of rejection unless vision, with correcting glasses, in the better eye is less than 6/9.

Special cases. If there is only one eye, or if there is only one useful eye, the other being amblyopic from non-progressive disease, which in no way affects, nor is likely to affect the good eye, the case should be judged on the condition of the good eye.

In the case of candidates for university and technical senior scholarships, or those intending to specialise as teachers of certain technical subjects, greater latitude may be allowed after consideration of special circumstances as to nature of work, condition of the candidate's eyes in other respects, etc.

ANNOTATIONS

National Committee for the Prevention of Blindness, Incorporated, New York City

Through the courtesy of the secretary we have received a bundle of the publications of this society, which was founded in 1915, for the purpose of meeting a need felt by workers in the field of prevention of blindness for some central agency to furnish information and to assist in forwarding this most important work. Among its supporters are physicians and laymen, men and women, interested in public welfare. "Half of all blindness is preventable; hence there is a field of activity for this committee in helping to create by agitation and education a condition of watchfulness and care that this great calamity to individuals and to Society shall not fall upon them needlessly."

The objects of this committee are as follow:

1. To endeavour to ascertain, through study and investigation, any causes, whether direct or indirect, which may result in blindness or impaired vision.
2. To advocate measures which shall lead to the elimination of such causes.

3. To disseminate knowledge concerning all matters pertaining to the care and use of the eyes.

The following programme has been arranged: "The preparation of circulars and literature for general distribution and furnishing these at nominal cost to workers for the conservation of vision; making available the latest authentic information relative to this special subject; collecting and rendering available for general use a library of literature, photographs, lantern slides, exhibits, *etc.*; rendering assistance and expert advice in the formation of similar societies; co-operation with educational and medical authorities (*a*) in the establishment and improvement of service relating to eye conditions, (*b*) in the establishment of sight saving classes for children of such limited vision that they cannot profitably use the books and other educational equipment provided for normally-sighted children; co-operation with safety and illuminating engineers to prevent eye accidents in the industries through the installation and use of safety devices and of adequate lighting systems; promoting legislation for improving the means of preventing blindness and impaired vision; publishing from time to time news of the movement for the encouragement and information of those engaged in the work." "The committee invites the assistance of all persons interested in its special subjects and all organizations for social improvement." "The function of the National Committee for the Prevention of Blindness is not to undertake case work, but to educate the public to an understanding of eye difficulties in such a way that they may apply the knowledge both to themselves and to their children. It is found on the whole that general health organizations touch very lightly upon the question of conservation of sight. The Committee has prepared a large quantity of literature, has a loan collection of 600 slides, issues posters, helps in legislative campaigns, single and in courses. So far as legislative work is concerned, the National Committee assists in drawing up bills to prevent blindness, from ophthalmia neonatorum, from the use of the roller towel, for financial State assistance in establishing classes for conservation of vision, for the control of wood alcohol, for making certain communicable diseases, such as trachoma, reportable, etc. Further, upon request, it sends a field secretary into any State, either to aid in appearing before legislators and special committees or in making an educational tour of the State for the purpose of preparing the lay mind for the necessity of such law."

The National Committee for the Prevention of Blindness contains the names of several well-known American ophthalmic surgeons and the Hon. William H. Taft, Chief Justice, is the Honorary President. All educationalists know that in order

to teach successfully, one must not be afraid of repetition; they also know how important it is to amplify what is spoken or written by clear illustrations. The literature which has been sent to us is well adapted to set forth in a striking way some of the many ills connected with diseases of the eye. The roller towel pamphlet contains excellent pictures of severe cases of trachoma as well as a picture showing an adult and a small child at work upon the same towel; trachoma, again, forms the chief burden of the "News Letter" No. 33. Ophthalmia neonatorum naturally comes in for a great deal of attention. Capital pictures are provided of children playing with scissors, pencils, buttonhooks and fireworks, "deadly play fellows." Besides these pictorial lessons, there are some reprints from the *Parents Magazine*, mostly written by Mrs. Hathaway, the Secretary of the Committee; some of these are adapted from well-known fairy tales and from books for little children; these are excellent, particularly the adaptation from the "Arabian Nights," where the Genie becomes the foul fiend of Columbian Spirit.

The eighth annual report of the Committee is included in the literature; it forms a brochure of 103 pages and is largely statistical. Two other pamphlets (1) concerning common causes of blindness in children and of the means and methods of prevention; and (2) a manual of conservation of vision classes, are excellent, well printed in clear type on very good paper and liberally illustrated.

There can be no doubt that such a Society is doing a great work in the United States, and in view of the recent report in this country on the causes and prevention of blindness, it is much to be hoped that work on similar lines will be undertaken in Great Britain at an early date. Many years have passed since the Ophthalmological Society of the United Kingdom issued a memorandum on the subject of blindness due to ophthalmia neonatorum to the Local Government Board, and a deputation headed by Sir William Bowman and Mr. Jonathan Hutchinson waited on the authorities and urged that, among other measures, the Registrar of Births should hand to each person notifying a birth a printed statement calling attention to the dangers of this disease. A full report of the proceedings will be found in Vol. V of the Transactions (page 31), from which it would appear that it was urged that the Registrars would object to this extra work and that the cost would be something over £7,000 per annum. No estimate was given of the sum that would be saved by the community in eradicating this, the chief cause of preventable blindness in children. Times have changed since that date and we honestly believe that the Ministry of Health at the present time is fully alive to the absolute necessity of dealing with this and other causes of blindness.

Butyn in Local Anaesthesia

Butyn does not appear to have been given an extensive trial in ophthalmic surgery in this country, save by Dr. W. M. Beaumont of Bath, who has found it altogether satisfactory. Perhaps the high price may account for this want of trial, or, perhaps, ophthalmic surgeons are more conservative than some of their colleagues in other specialities, and having found cocain a safe local anaesthetic over a good many years, are loath to give up using it so long as it can be obtained. Those who have used butyn seem to agree that it causes excessive smarting after it has been instilled, and some mention has been made of hyperaemia. The only unpleasant ophthalmic experience we have so far found recorded in this country is in a case by Dr. James Kerr (*Brit. Med. Jl.*, 1923, Vol. II, p. 947), where a small quantity of the solid drug was placed on a stye, and, although it was washed off after a few seconds, it produced white sloughing of the conjunctival surface and violent chemosis. But reports are beginning to be published in the medical press with regard to the disadvantages of butyn, especially in surgery of the air passages. Dr. G. William Hill, in a paper in the *Brit. Med. Jl.* some three months ago, reported that some of his cases failed to respond to butyn, and that in many cases there was hyperaemia and excessive secretion of mucus; whilst Sir St. Clair Thomson (*Brit. Med Jl.*, Feb. 9th, 1924, p. 235) sounds a note of warning. He reports four cases; complete anaesthesia was obtained in only one case, and in that case, the operator had the unpleasant experience of seeing his patient at the completion of the intra-laryngeal operation half rise from the chair and be seized with an epileptic convulsion when he was laid out flat on the consulting room floor. In a second case the butyn was found to be effective, though it took longer to act than cocain, and in each of these two cases, the secretion of mucus was profuse. In two cases, butyn was found ineffective in producing a proper anaesthesia.

Dr. Beaumont (*Brit. Med Jl.*, 1923, Vol. II, p. 1121) quotes from a report of Professor Roger Adams of the University of Illinois, one of the discoverers of butyn, on the subject of five deaths which have occurred when this drug was used. In one case, no details could be supplied, in one case, an intraspinal injection had been given and in the other three cases there had been a combination of butyn with other drugs.

These cases make rather alarming reading and we cannot help feeling that butyn must have, as Mr. Shandy said of the science of fortification, its weak points.

OPHTHALMOLOGY AT THE AUSTRALIAN MEDICAL CONGRESS

The Australian Medical Congress was held in the buildings of the University of Melbourne from November 12 to 17, 1923. The President of the Ophthalmological Section was Dr. Paton of Perth, who, in the course of a very interesting presidential address gave first-hand practical information on the intra-muscular use of milk in the treatment of trachoma. The proceedings of the Section included a discussion on the treatment of trachoma, in which a number of members deprecated the excision of the tarsus on the ground that it does not prevent recurrence in many cases, and it renders subsequent treatment exceedingly difficult.

Dr. Lockhart Gibson of Brisbane, drew attention to the danger run by the assumption that a negative Wassermann reaction excludes syphilis, and illustrated his thesis.

Dr. Leonard Mitchell presented the result of a clinical study of 110 cases of renal disease and arterio-sclerosis. The general opinion of members was that the so-called albuminuric retinitis was a symptom of extreme gravity when white effusion made its appearance, that haemorrhages were of very little serious significance, and that albuminuric retinitis without high blood pressure was uncommon.

An elaborate analysis from the hereditary point of view of perinuclear cataract was furnished by Dr. J. Kingland Anderson. The hereditary nature of the condition was made fairly obvious.

Sir James Barrett produced some cases of accidents at sea, which may have been caused by defective vision. They were cases, notes of which were posted to the late Edward Nettleship from Australia, but reached London after his death, and are now on record. He also urged the appointment of schools for myopes and emphasized the importance of the work begun by Dr. Ernest Maddox of Bournemouth. As oculist to the Royal Victorian Institute for the Blind he furnished an analysis of all the cases which had entered that Institute for the last 20 years, and showed that at least half of the cases of blindness in children were due to venereal disease.

Dr. Newman dealt with the causation of myopia from the point of view of the failure of the membrane of Bruch, and Dr. Temple Smith gave an elaborate exposition of his method of rectifying strabismus.

The papers will appear in full in the *Australian Medical Journal*. An excellent clinical demonstration was given at the Eye and Ear Hospital, Melbourne, on the afternoon of Tuesday, November 13.

ABSTRACTS

I.—STRABISMUS

(1) **Sauvineau, Charles —The cerebral origin of strabismus and its treatment by glasses of complementary colour. (L'origine cérébrale du strabisme et son traitement par les verres de couleur complémentaire.)** *La Clin. Ophtal.*, July, 1919.

(1) The optimism of French writers is astounding. Still, there is so much of interest, whether it be sustained as accurate by others or not, that the reviewer has thought it well to translate the first part of **Sauvineau's** article, giving the second part in abstract.

"A. The deviation of one of the eyes is such a characteristic symptom of strabismus that it has been identified with strabismus itself. Nevertheless, it is only a secondary symptom which is capable of disappearance without modification of the affection.

Persistent attempts to straighten squinting eyes whether surgically or by the constant wearing of lenses are useless, because the causes of strabismus are situated elsewhere than in the ocular apparatus properly so called. They are of cerebral origin, as Javal and Parinaud have established. But they are still little understood and that is why so many squinters are not cured.

Strabismus, according to Parinaud, is an affection of the convergence function which prevents the visual lines from meeting on the object fixed. But the affection of the convergence function is itself only an effect, the cause being still higher up.

The very essence of strabismus is a hereditary state of the brain (*un terrain cérébral, héréditaire*) of such a nature that the brain only perceives through its cortical visual centres the visual image from one of the two eyes. Every squinter is blind of one eye for cerebral reasons. (*Tout sujet qui louche est un borgne cérébral.*)

It is not because of amblyopia of the deviating eye that the cerebral vision is unilateral. Very often there is no amblyopia and sometimes the two eyes are equally good. None the less it is always the case that visual perception remains unilateral. The brain excludes or neutralizes the image from the squinting eye.

This was noted by Javal and more recently by Remy. But neither of them grasped the fact that this exclusion by the cerebrum is *constant* and that it is the *pre-existing* cause of the strabismus. Quite the contrary, for they regard it as a consequence of the strabismic deviation. According to these authors the brain in a psychic manner excludes the deviated image in order to avoid

diplopia. But why does that never happen in muscular palsies in which the diplopia is so embarrassing? The answer is that muscular palsies occur for the most part in those whose brains do not present the defect necessary for the production of strabismus.

The tendency to cerebral fusion of the visual images of the two eyes, which is so strong in normal subjects, is absent or feeble in squinters. And it is this characteristic, which we believe to be hereditary, which appears to be the true cause of the strabismus. Where it exists, the least obstacle to binocular vision, such as a nebula or ametropia, is sufficient to cause strabismus. And where, on the other hand, it is absent the most embarrassing optical obstacles are powerless to produce it.

In short, in true strabismus (for one must set aside insufficiences of convergence with latent diplopia, which represents only a pseudo-strabismus) the fundamental idea must always be present to the mind that *every strabismus represents unilateral cerebral vision.*"

B. The Author next proceeds to discuss treatment. The first requirement is to re-establish binocular cerebral vision. When this is done the eye will straighten itself as a consequence and no relapse will be possible. This re-establishment of binocular cerebral vision is in two stages, namely the establishment of simultaneous vision by educating the nervous centres to perceive two images simultaneously, and thus, diplopia; and, secondly, to convert simultaneous vision into binocular vision.

The first *desideratum* is obtained simply by means of a red glass before the deviating eye and a green glass before the fixing eye, the patient regarding a point of light. When diplopia has been established in place of suppression of the image belonging to the squinting eye the patient is taught fusion by the same means. He is instructed in the relaxation or increase of convergence as may be required, and in high degrees of squint it may be necessary to approximate the images by means of prisms. The united image has of course a mixed colour, and if the glasses could be of really complementary colours the united image would be white. All this is, of course, commonplace in detail; the author's point being that the method by coloured glasses is the simplest method of obtaining fusion, since it neither involves complicated apparatus nor skilled science in its application. The author asserts, and this is where the optimism comes in to which the reviewer referred at the beginning, that cure is obtained in every case, since amblyopia is not an obstacle to it, after several weeks or several months at the most.

ERNEST THOMSON.

(2) **Kleefeld, Dr. G. (Brussels).—The correction of strabismus by a crown suture. (Correction du strabisme par la suture en couronne.)** *Arch. med. belges*, March, 1920.

(2) **Kleefeld** is not satisfied with the hold obtained by the ordinary sutures in muscle shortening for strabismus. The suture described in this paper gives a great increase to the tearing strain

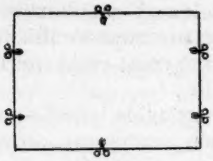
Fig. I.

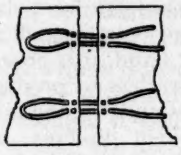
Fig II.

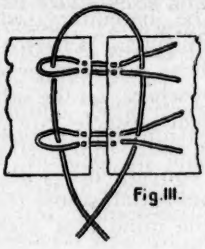
Fig. III.

required to split a piece of gauze over that obtained by the usual methods. The diagram explains the method. Kleefeld finds it easier to use an ordinary spring needle, and catgut for the suture.

E.E.H.

II.—TROPICAL DISEASES

(1) **Fernando, A. S.—The eye in Beri-Beri.** *Amer. Jl. of Ophthal.*, May, 1923.

(1) This paper is from the Manila General Hospital and deals with the ophthalmological complications of beri-beri. The literature of the eye findings in this disease is mainly from Japanese observers. Three cases are recorded; the symptoms include dimness of vision, colour sense disturbances, blurring of the optic disc and slight neuro-retinitis. Beri-beri is a deficiency disease, and McCollum found that lack of substances containing fat soluble A in the diet gave rise to xerophthalmia, and that if the water soluble B constituent were lacking beri-beri resulted. Vedder holds that the disease is due to faulty metabolism, and is directly caused by deficiency of a certain vitamine or possibly of several vitamines in the food. The author's comments are as follow: a definite history of beri-beri was obtained in each case, the cases were walking cases, complaining of numbness of the legs, weakness and slight dyspnoea, in all the diagnosis was confirmed in the medical department. The chief eye complaints were foggy vision and dazzling in bright light; externally the eyes

were normal, there was some narrowing of the palpebral fissure to avoid glare; vision was not much impaired, but the letters of the 6/9 or 6/6 line were obviously read very slowly and with difficulty; a marked contraction of the green field has been found in all cases in which the field has been taken; one case showed a low grade of neuro-retinitis, but in most no more than a slight blurring of the disc was found; recovery was slow, the only treatment adopted was the improving of the general health with tonics.

R.R.J.

(2) **Stark, H. H. (El Paso, Texas).—Ophthalmia Myiasis Externa, due to Larvae of Oestrus Ovis.** *Jl. Amer. Med. Assoc.*, November, 1923.

(2) The author records an interesting case of ophthalmic myiasis of unusual origin. A girl of 16 years of age complained of burning itching of one eye of two days duration, and stated that several small white objects, which she thought were worms, had been taken from her eye at home. On examination, a marked conjunctivitis was found, the eye being excessively watery, and a number of small white organisms were seen swimming rapidly across the conjunctiva; on attempting to remove any of them, they appeared to bury themselves in the conjunctiva, which made their removal a matter of some difficulty. Next morning the congestion was more marked, but it subsided in a week's time with the use of a simple lotion. The patient had felt something, which she took to be a gnat strike the eye two days before her illness began.

The larvae which had been removed from her conjunctival sac were sent to the Bureau of Entomology, U.S.A. Department of Agriculture, and were eventually classified as the first stage larvae of the common sheep-bot. The life cycle of the larva is that it is deposited by the fly, while in motion, in the nostrils of the sheep. It finds its way into the nasal sinuses, where it slowly changes into the second stage, remaining practically dormant through the winter months. In the spring development begins, the size increases, and it passes into the third stage and becomes active, causing staggering, loss of weight, and often the death of the host. On reaching maturity it is expelled and reproduces the fly, which is more prevalent during the warm months and whose movements take place only during the warm part of the day.

A female fly may contain several hundred larvae, but when these are deposited voluntarily, there may be no more than a dozen.

The paper is illustrated with pictures of the fly and of the larva, the latter is very like that of the horse-bot in size and shape.

R.R.J.

III.—DISEASES OF CONJUNCTIVA

(1) **Alt, Adolph (St. Louis).—A partly pigmented Naevus of the Caruncula Lacrimalis.** *Amer. Jl. of Ophthal.*, January, 1917.

(1) The most important paragraphs in the histological description by Alt appear to be the following:—"In this naevus the naevus cells do not seem to have been derived from the epithelium as in no section (and the whole tumour was sectioned) are the naevus cells in contact with the outer epithelium. The arrangement in this tumour gives the impression that the naevus cells have grown from the deeper connective tissue parts towards the epithelium, as there is everywhere a small amount of connective tissue between the naevus proper and the outer epithelium. Very few of the naevus cells proper contain pigment, the larger amount of chromatophores lie in this small layer of connective tissue. "While the naevi of the conjunctiva I have previously had occasion to describe seemed decidedly to speak for Unna's opinion, according to which the naevus cells are derived from the outer epithelium, the specimen here described seems rather to support Ribbert's view, according to which the naevus cells are of connective tissue origin."

ERNEST THOMSON.

(2) **Penichet.—Contribution to the general study of trachoma in Cuba. (Contribution al estudio general del trachoma en Cuba.)** *Arch. de Oftal., Hisp.-Amer.*, May, 1917.

(2) Statistics on the amount of trachoma in the island of Cuba are available from 1882 to 1915; the authors vary a good deal in their results, but it seems that roughly 3.5 per cent. of the ophthalmic cases in the Cuban clinics are trachoma. In the years 1907 and 1911 the percentage rose sharply to roughly 10 per cent. and 20 per cent. respectively, for which errors in diagnosis seem to have been principally responsible; a very large number of acute catarrhs were apparently accepted as trachoma, partly on account of the clinical resemblance of the cases to trachoma and partly because they yielded to the usual anti-trachoma treatment.

The subject of trachoma in Cuba was first investigated in 1853 by du Villards, who took only two of its provinces into consideration; he proved that trachoma was rife among the army, it being a common mode of obtaining exemption from military service to inoculate the conjunctiva with trachomatous secretion.

Penichet discusses the bacteriology of trachoma and suggests a fungus as the most probable cause.

A map of the island is appended which shows the percentages of trachoma in the various provinces of the island. It would have been

more interesting if a note of the island's population had been added. Finally the author gives his results of the treatment of ten cases of trachoma by vaccino-therapy, which line of treatment does not seem to have been very encouraging.

R. R. J.

(3) **Marin (Almeria).—Angioma of the conjunctiva of traumatic origin. (Angioma de la conjuntiva de origen traumatico.)** *Arch. de Oftal. Hisp.-Amer.*, June, 1917.

(3) **Marin** records an interesting example of a somewhat rare condition, angioma of the conjunctiva, which occurred in a female, aged 52 years. The history was that 4 years previously she had unintentionally introduced the end of a cane under the upper lid of the left eye into the fornix conjunctivae. A good deal of inflammatory reaction followed and persisted so long afterwards that her doctor feared that a foreign body was left in the wound, but none was found. Shortly after the inflammatory signs had cleared up, the patient noticed a small lump between the lid and the globe, which lump had gradually increased in size.

In 1914 she came under the author's care and her condition is well shown in the photographic illustration which accompanies his paper. A lump the size of a small nut was present in the outer part of the left upper lid, the palpebral aperture was somewhat narrowed and from under the free edge of the lid projected a red almond shaped tumour, which extended inwards across the outer 2/3rds of the length of the lid edge. On everting the lid it was seen that the two lumps were really parts of one and the same tumour, which presented all the characteristics of a cavernous angioma, its limits were sharply defined, it was slightly reducible in size by compression and its size was appreciably increased by coughing, stooping and straining efforts. The application of a pressure bandage having caused only a partial diminution in size of the tumour, it was decided to treat the case by electrolysis. Three sittings were sufficient and the result appears to have been excellent.

A bibliography is appended.

R. R. J.

(4) **Taylor, S. Johnson (Norwich).—Membranous Conjunctivitis following a Squint Operation.** *Lancet*, September 1, 1917.

(4) **Johnson Taylor** reports a case in which an advancement and tenotomy operation was done, and was followed by diphtheritic infection of the advancement, though not of the tenotomy wound, two days after operation. Diphtheria was diagnosed clinically from the appearance of the wound and the history of diphtheria in the child (aged 11 years) and others in the family at Christmas,

1916. Bacteriological examination was not made. Taylor comments specially on the fact that the attack of general diphtheria did not confer any immunity against the local infection. It is noteworthy that before the operation on the child with squint, another child in the family had been, and still remained, at the time of writing, in an isolation hospital as a carrier of diphtheria.

ERNEST THOMSON.

(5) **Shastid, Thomas Hall (Superior, Wis.).—A Composite Ophthalmia Neonatorum Law.** *Amer. Jl. of Ophthal.*, Series 3, Vol. I, No. 1, January, 1918.

(5) **Shastid,** thoroughly dissatisfied with the state of legislation in America in connection with ophthalmia neonatorum (see also his article in American Encyclopedia of Ophthalmology, Vol. IX, p. 7138) has gone to much trouble and study in drafting a proposed law which he earnestly brings to the attention of the profession. It is entitled "An Act for the Prevention of Blindness, imposing a duty upon all Physicians, Midwives, Nurses, or other persons having the care of infants, and also upon Health Officers, and fixing penalties for the neglect thereof." We need not give the proposed law in too much detail since parts of it are not applicable to this country, but it is right to state the principal provisions.

Section 1.—"That any diseased condition of the eye or eyes of any infant in which there is any inflammation, swelling or redness in either one or both eyes, either apart from or together with any unnatural discharge from the eye or eyes, at any time within two weeks after the birth of such infant, shall, independently of the nature of the infection, be known as ophthalmia neonatorum." *Section 2* makes it incumbent upon any person in professional attendance upon a birth to instill one of the following prophylactic preparations, namely two drops and no more of a one per cent. solution of nitrate of silver in distilled water, kept in a dark amber, or dark blue bottle, and not more than three days old, or, two drops of twenty-five to forty per cent. solution of argyrol, absolutely fresh, or of protargol same strength. *Sections 3 to 14* refer to the duty of reporting cases of such ophthalmia neonatorum, to official proceedings and to penalties. *Section 15* runs as follows: "Whereas, about thirty per cent. of all blindness is caused by ophthalmia neonatorum, and whereas the disease may always be prevented, and almost always cured in its incipiency (its damage to the sight being therefore due, as a rule, to ignorance or carelessness); and whereas an emergency exists, therefore this law shall be in force immediately after its passage and approval."

ERNEST THOMSON.

(6) **Luna, F. Pacheco.—Contribution to the study of Trachoma in Guatemala. (Contribucion al estudio de Trachoma en Guatemala.)** *Arch. de Oftal., Hisp.-Amer.*, February, 1919.

(6) In spite of the fact that a large number of the inhabitants of Guatemala appear to live under very unhygienic conditions, trachoma is very rare there. The author's predecessor, Alvarez, was of the opinion that trachoma was not a disease of that country, and that the few cases which were met with in his day were imported ones; **Pacheco Luna** supports this view. For the last two years he has undertaken a special search for trachoma, hunting for signs of it in every eye which he has examined, and, up to date, his results have been negative. He has never seen a case in a Creole.

Pacheco Luna does not say that trachoma is non-existent in Guatemala, but that it is so rare that he insists on a strict prophylactic examination of all immigrants, in order that this happy state of affairs may continue.

R. R. J.

(7) **Darier, A. (Paris).—Wrestlers and the contagion of trachoma. (Contagion du trachome chez les lutteurs.)** *La Clin. Ophtal.*, November 1922.

(7) **Darier** has had three cases lately in which the contagion of trachoma was communicated in the course of a wrestling match. He refers also to a recent paper by Patton, of Omaha, in the *Amer. Jl. of Ophthal.* for July, 1922. It seems from what Patton and Darier say that the most probable explanation of the contagion taking place is that athletes know by very old established experience the importance of the oculo-cardiac reflex by pressure upon the eyeball, and that they purposely dig their fingers into the eyes of their opponents. Apparently, Patton thinks that the medium by which the contagion is conveyed is sweat. Darier, however, considers it more likely that the infected wrestler, finding in the heat of combat that his eyes are troublesome, rubs away the tears and mucus with his fingers, through which the contagion is transferred to his opponent.

NOTE.—The oculo-cardiac reflex above referred to, and which consists in a change in the heart's rate or rhythm following pressure upon one or both eyeballs, was first described by Aschner in *Wien. klin. Wochenschr.*, XXI, p. 1529, 1908. See American Encyclopedia of Ophthalmology for further information on the subject of this reflex.

ERNEST THOMSON.

(8) **Lacat, Dr. (Paris).—The treatment of granular conjunctivitis. (Traitement de la conjonctivite granuleuse.)** *La Clin. Ophtal.*, July, 1923.

(8) One almost despairs of hearing of anything new or effectual for the treatment of trachoma, yet the experience of **Lacat** in Egypt is so great (9,600 operations in twelve years) and mainly by means of one particular method, that one feels that at any rate here is something positive. The method employed is not new; that of *brossage*. It has been applied by Lacat in no fewer than 5,163 cases of trachoma. These are large figures; Lacat states that 80 per cent. of these patients have been completely cured; the remaining 20 per cent. were either greatly improved or required a second course of treatment. It is evident from the description that the treatment must make considerable demands upon the surgeon's time and the patient's persevering courage. Under either local or general anaesthesia the upper eyelid is completely rolled outwards upon itself by means of Darier's toothed forceps. This of itself breaks up the gelatinous mucous tissues. With a keen bistoury three or four long deep incisions are made parallel to the lid margin and exposing the submucous tissue. With a carefully sterilised (ether and alcohol) fairly hard tooth brush, dipped in 1 to 500 cyanide of mercury, the mucous membrane is gently brushed two or three times, replacing the lid on each occasion and allowing it to bleed freely before turning it out again for the next application. The lower lid is dealt with in the same way, but more superficially. Moist cyanide compresses are then kept upon the closed eyelids and changed hourly, the lids being separated as well as can be done and the eye bathed out upon each such occasion. A permanent dressing is *never* employed. No ointment or anything of the sort is inserted within the eyelids. After 48 hours, under cocain anaesthesia, the eyelids are again everted as well as possible and the mucous membrane is rubbed "with gentle energy" with a sterilised cotton swab soaked in 1 to 1,000 cyanide, free bleeding being caused. This is done every two days for a month, and thereafter the patient bathes the eyes regularly with an antiseptic solution, the eyelids being only occasionally, at longish intervals, everted by the surgeon. "Neither cicatrix nor adhesion results from this treatment."

ERNEST THOMSON.

(9) **Aubaret.—Neoplastic Pterygium. (Ptérygion Néoplastique.)** *La Clin. Ophtal.*, May, 1923.

(9) **Aubaret** describes a recurrent pterygium which was repeatedly ablated and then, owing to the carelessness of the patient, was allowed to grow till it reached the size of a small nut. The patient was 68 years of age. The tumour, which was deeply

adherent to the cornea, was dissected off from that membrane and removed along with the caruncle and plica. The gap in the cornea was covered with a sliding flap from the cul-de-sac. The tumour was closely adherent only to the cornea, being easily removed otherwise. The following quotation gives the essentials of the histological examination. "The tissue of the tumour itself is composed of very numerous cellular elements which suggest sarcoma, but there are also numerous typical giant cells formed by coalescence of groups of these elements. Lastly, there are mucus cells with large nucleus and granular reticulum, situated in the centre of a plasmodial mass about which it is difficult to give an opinion. The vessels, except here and there, have no visible walls."

It is difficult to know for certain, says the author, whether this is a benign or a malignant tumour. He expects to have, later on, a more detailed microscopic account which may assist the diagnosis.

ERNEST THOMSON.

(10) **Coppez, Henri (Brussels).—On tuberculides of the Conjunctiva. (Sur les tuberculides de la conjonctive.)** *Rev. Gen. d'Ophtal.*, May, 1923.

(10) **Coppez** refers in the first place to the condition known to dermatologists as "tuberculides" in tuberculous subjects. It has long been known that these do not present the bacilli but are of toxic origin. Among the cutaneous manifestations coming under the head "tuberculide" the most frequent and characteristic is *lichen scrofulosorum*. Friede, Engelking and others have pointed out that in tuberculous subjects there may be observed pimply eruptions on the bulbar conjunctiva which are absolutely analogous to *lichen scrofulosorum*. These are often coexistent with the latter. There are small translucent prominences which are situated, preferably, in the neighbourhood of vessels. They are ephemeral and disappear without ulcerating. The evolution appearances of these tuberculides are quite different from those of phlyctens. These conjunctival tuberculides are not of common occurrence, but, possibly, in view of their minuteness, fugaciousness and indolence they may have escaped the attention of the clinician. (The reviewer has been greatly interested in this description. He has seen cases which may possibly be of this nature and which he has been unable to explain, and which his colleagues have not been able to explain either. In the last case which the reviewer saw the elevations were so extremely small that they could hardly be seen without a magnifier, they involved the cornea as well as the conjunctiva and their indolence was much more marked than their fugaciousness. Their size seems to correspond accurately with Coppez's "hardly visible to the naked eye.") Coppez proceeds to

say that these tuberculides have been observed especially in the following conditions, namely, during the epoch of the use of the ophthalmo-reaction; during the course of a certain number of frankly tuberculous affections such as scleritis, iritis and keratitis, and occasionally in eczematous conjunctivitis without obvious tuberculosis; and, finally in Miculicz' disease. The remainder of the paper is taken up with a full description of two cases of Miculicz' disease seen by Coppez in which these tuberculides occurred, and he comes to the following conclusion. "These two observations appear to me absolutely demonstrative. The appearance of typical conjunctival tuberculides in considerable number, in the course of uveitis complicating hypertrophy of the lacrymal and salivary glands, is a most interesting fact, and one which clears up the origin of Miculicz' disease, or uveo-parotid fever, whichever one pleases to call it. It is a tuberculous manifestation which once more shows the protean character of infections due to Koch's bacillus."

ERNEST THOMSON.

IV.—DISEASES OF IRIS

(1) **Löwenstein, A.—Roseola-like affection of the iris associated with punctate conjunctival haemorrhages in the haemorrhagic diathesis. (Roseolenähnliche Affection der Regenbogenhaut neben punckttörmigen Bindehautblutungen bei hämorrhagischer Diathese.)** *Klin. Monatsbl. f Augenheilk.*, November-December, 1917.

(1) **Löwenstein** acting as director of the ophthalmic side of the reserve hospital at Zenica in Bosnia, after mentioning that Fialkowsky observed ocular symptoms in 3.5 per cent. of all cases with a haemorrhagic diathesis, states that in the winter of 1915-16 he examined 150 cases of articular rheumatism with subcutaneous haemorrhages and often with scorbutic gums, without finding a single conjunctival haemorrhage. He was surprised to find great turgescence of the retinal veins which were difficult to empty by pressure on the globe; in fact an arterial pulse appeared, before any alteration took place in the veins on the disc, and the arteries were apt to collapse before the veins. No fundus haemorrhages were seen. The larger portion of the paper is devoted to a case which Löwenstein describes as being intermediate between Werlhof's disease and haemophilia. Here there were numerous petechial conjunctival haemorrhages, and a roseola-like infiltration of the iris. There was no actual iritis.

T. HARRISON BUTLER.

(2) **Li, T. M. (Pekin).—Primary ring sarcoma of the iris.** *Amer. Jl. of Ophthal.*, July, 1923.

(2) The case occurred in a farmer, aged 22 years, who was admitted to Verhoeff's clinic in Massachusetts in the early part of the year 1922. The complaint was that the eye had been misty and bloodshot for about a month; there had been no pain but he was conscious that certain dark coloured spots had appeared in the iris of the affected eye. On examination a small deeply pigmented growth was found in the upper and outer quadrant of the iris, and the tension was found to be considerably raised, the field being restricted and the disk cupped. Excision was advised, but the patient refused to have the operation performed and left hospital. After a few months he returned and submitted to excision.

Microscopical examination showed that the tumour extended along the root of the iris for about 7 mm., the angle was blocked in this region and the anterior surface of the growth was closely applied to the back of the cornea for a distance of 2.5 mm. The apex of the growth reached to midway between the root of the iris and the pupil edge; continuing the main tumour was a narrow deeply pigmented ring extending round the remaining circumference of the angle of the anterior chamber.

The tumour was composed of spindle-shaped cells and contained much pigment; the pectinate ligament beneath the main tumour was replaced by tumour cells and the canal of Schlemm could not be recognized; the endothelium was destroyed, but Descemet's membrance was intact; in sections away from the main growth a marked involvement of the filtration angle was everywhere observed.

The growth appeared to spring from the anterior surface of the iris and the ciliary body showed involvement.

The author finds records of five cases of ring sarcoma of the iris and of five cases of ring sarcoma of the ciliary body in the literature and gives short abstracts of these ten cases.

R.R.J.

(3) **Lloyd Mills (Los Angeles).—Amoebic iritis occurring in the course of non-dysenteric amoebiasis.** *Arch. of Ophthal.*, November, 1923.

(3) **Lloyd Mills** notes that in spite of the resolution of " rheumatic iritis " into dental, tonsillar, respiratory, genito-urinary, intestinal and acute general infectious components of origin, there still remain cases of iritis, usually of the chronic recurring type whose origins are obscure and whose treatment is unsatisfactory.

Four such cases are reported. The first, a woman of middle age had intractable plastic iritis in the R.E. for ten years. Occlusion of the pupil with onset of secondary glaucoma necessitated enucleation. Three weeks later, an identical iritis started in the left eye. There were constipation, tenderness over the colon with secondary anaemia and joint pains.

It is noteworthy that no entamoebae were found until the third faecal examination was performed when they were present in large numbers. A simultaneous cure of the iritis and abdominal symptoms followed two intensive courses of treatment with ipecacuanha and emetin.

The fourth case was treated for several months with emetin in 1912. The ocular inflammation and iritis disappeared and have not recurred up to date. The second and third cases were somewhat similar but had not been under treatment for any length of time.

A long commentary on these cases follows. The principal points are:—The greatest single factor which has hindered the general recognition of the pathogenicity of the human intestinal protozoan fauna has been, that the one criterion of their capacity for harm has been wrongfully assumed to be the presence of diarrhoea. In fact, partial stasis produces the only successful incubator for protozoan parasites of any type and upon this rests the ability of otherwise harmless parasites to develop substances of pathogenic power.

Hence in all cases of chronic intractable iritis of obscure origin and especially if there is any associated gastro-intestinal disorder protozoan and particularly amoebic infection must be considered. Amoebiasis is now known to occur in practically every country of temperate climate as well as in the tropics, with this difference, that dysentery is often a more predominant feature in the tropics than in higher latitudes.

The amoebae may remain in the lesions of the colon for considerable periods and six consecutive daily specimens should be examined, including formed as well as fresh liquid stools.

The iritis arises probably by means of amoebic emboli, which enter the blood stream through the intestinal lesion, the bacteria coming on the scene as a secondary infection.

F. A. WILLIAMSON-NOBLE.

V.—OPERATIONS

(1) **Lamb, H. D. (St. Louis).—Two points of controversy in magnet extraction of foreign bodies from the vitreous chamber.** *Amer. Jl. of Ophthal.*, May, 1917.

(1) The two points which **Lamb** discusses are, which magnet is preferable, and, which route is the most desirable? To the first he finds a definite answer, but with regard to the second, after discussing the views of authorities, says that "it seems best to evade any definite statement."

Dealing only with the first question, one may transcribe most of the writer's statement. "Selection of the magnet for our work (that is giant magnet *versus* small magnet) depends largely upon the size and location of the foreign body, although the route chosen will of necessity have some influence." Turk found that in general for splinters from 1 to 250 mg. in weight, when the splinter is in direct contact, the power of the Hirschberg is but little less than that of the Haab. At 2 mm. distance from the splinter, however, the Haab magnet is from 7 to 21 times as attractive for splinters weighing 1 to 250 mg. as the Hirschberg, and the more the distance is increased the more favourable become the readings for the Haab magnet. The results of experiments by Barkin, Sweet, and the Meyrowitz company seem to establish definitely the great superiority of the Haab magnet in attracting small foreign bodies at a distance of 5 mm. or more from its tip. Where the magnet tip can be brought within 5 mm. of the foreign body, it is only necessary to use a large magnet if the particle is very small—1 mg. or less. For larger particles within 5 mm. the advantages of a hand magnet are very great, in that it is more easy to handle, and the foreign body can be more gently detached, and drawn through the tissues with less disturbance. Of course, in some cases where the foreign body has been for some time in the vitreous and has become encapsulated by fibrous tissue, the small magnet, although applied within 5 mm. of the particle, may fail to extract it, and recourse should then be had to the giant magnet similarly applied. If the giant magnet fails likewise, there should then be attempted Jackson's operation with scissors and the large magnet.

ERNEST THOMSON.

(2) **Lancaster, Walter B. (Boston, Mass.)—A satisfactory operation for muscle shortening or advancement.** *Amer. Jl. of Ophthal.*, Series 3, Vol. I, No. 3, March, 1918.

(2) **Major Lancaster** introduces his operation modestly, making no exaggerated claims for it, and merely suggesting that those who may not have been able to work out a satisfactory method

for themselves should try this one. The reviewer does not remember ever to have read a more clearly described and illustrated description of a squint operation, and yet it is almost impossible to describe in abstract and without the illustrations. Originality in squint operations is now almost impossible of attainment on account of the number of methods described, and it is felt that no very great originality of conception attaches to this particular one. Some details are different from those ordinarily employed. To begin with the author incises the conjunctiva longitudinally to avoid haemorrhage by keeping along the line of vessels instead of across them. He leaves a stump next the cornea in order to get a good hold for a "security stitch," which takes origin from it. The principal stitch is the "whip stitch," which in effect binds the muscle fibres together at the upper and lower margins. The security stitch passes from its fixed point at the corneal stump to behind the principal stitch in the muscle and emerges through the conjunctiva, upon the surface of which it is tied after the principal stitch has been tied, on the conjunctival surface of the stump. It secures "close and effective apposition of the muscle and sclera," and, therefore, the principal stitch does not require to be pulled right home unless the operator thinks it necessary. The principal stitch is thus adjustable. It is claimed *inter alia* that the conjunctival incision employed closes with the best cosmetic results, and that the stitching is so secure that prolonged bandaging is unnecessary. An extra conjunctival stitch may have been necessary and this is removed on the third day. The security stitch is removed on the sixth or seventh day, and the principal stitch not before the tenth day. For anaesthesia the author prefers to inject novocain (2 cc. at most of a 1 per cent. solution) or cocain (a smaller quantity of ½ per cent. solution) under the capsule of Tenon. Adrenalin is always added to either solution.

The full details of this operation may well be studied in the original illustrated description.

ERNEST THOMSON.

(3) **Dor, L. (Lyon).—The technique of the extraction of non-magnetic intraocular foreign bodies. (Technique de l'extraction des corps étrangers intraoculaires non-magnétiques.)** *La Clin. Ophtal.*, March, 1919.

(3) The article by **Dor** is short and deals mainly with the difficulty of extracting non-magnetic foreign bodies from the interior of the eye (behind the lens). The author puts no faith in the radioscopic screen, and considers that the only chance is to work with the forehead mirror and electric illumination. One gathers that if the lens is opaque the author first removes it and

operates on the foreign body later. If the lens has already been removed one works through a sclero-corneal incision. If the lens is in place and clear an equatorial incision is employed. Dor has endeavoured to remove foreign bodies with a single instrument for penetrating and removing, but has not succeeded. He now holds that a regular forceps is essential, and has been using a forceps made by Colin in 1880, after a pattern by Dor *père*. It is made on the principle of urological instruments, being composed of two blades on the ends of two springs. The blades are opened and closed by means of a sliding tubular sheath. "The whole operation is carried out in a dark room, using a frontal mirror with two openings in front of the eyes of the operator; the mirror is illuminated by an electric lamp." Dor relates an interesting case of an officer wounded in both eyes, one eye being quite useless and the other cataractous. The cataract was first removed. Afterwards two minute pieces of copper were successfully removed, the second one with great difficulty. The point of the case is that the patient had been condemned as blind, but when the condition was explained to him, after removal of the opaque lens, he preferred to be operated on, saying that he would sooner be blind than have sight which might at any moment be lost by severe inflammation of the eye. Dor says frankly that he was biased in favour of operation by the result of a similar case where he had refused to operate, preferring to leave the fragments in the eye to take their chance for good or ill, and where the eye had afterwards had to be enucleated.

ERNEST THOMSON.

(4) **Abadie, Charles (Paris).—Pericarotid sympathectomy in certain optic atrophies. (Sympathectomie peri-carotidienne dans certaines atrophies optiques.)** *La Clin. Obhtal.*, September, 1920.

(4) **Abadie** says that he has for a long time studied a particular form of optic atrophy which he attributes to a vice of nutrition due to permanent vaso-constriction of the arterioles of the nerve trunk. The following are its characteristics. The fields are constricted, this constriction commencing on the nasal side as in glaucoma and passing on especially to the lower field. Central vision remains for a long time relatively good. The inner and upper fields remain long after the nasal and lower fields have gone. Finally, these latter also disappear and blindness becomes complete. The vision is characteristic in that it varies from day to day and even from hour to hour. Objectively, "the pupils, while not in miosis as in tabetic optic atrophy, are nevertheless smaller than normal, and, although the light reflex has disappeared, when one eye is more advanced in atrophy than the other, the

pupil is smaller on the more advanced side. Further, the pupil no longer acts normally to mydriatics. A moderate dilatation only is produced. Ophthalmoscopically the disc is white with sharp contours, but the arteries are manifestly reduced in size and diminish as the condition advances. The calibre of the veins is relatively well maintained."

Having thus reached a conclusion as to the cause of this class of optic atrophy, namely, spasm of the retinal arteries, Abadie resolved to put it to the test, by operation on the fibres of the sympathetic which surround the internal carotid artery. We may leave out the detailed history of the case selected for operation: a man of 50 years, left eye already blind, inner and lower fields of right eye lost, temporal field restricted, upper intact; visual acuity $=\frac{1}{3}$. Operation was undertaken by Abadie and Bourguet at the Hotel-Dieu, Paris, on April 4, 1917. The bifurcation of the right carotid having been exposed, the internal carotid was stripped of its sheath for about a centimetre from its origin. Vision rapidly improved till at the end of a fortnight the nasal field approached the normal. The lower field recovered more slowly and less completely. The visual acuity improved to 2/3. At the end of a month the result might be called brilliant, but, as one can well imagine, to Abadie's enormous disappointment, at the end of two months the fields began gradually to recede again and eventually arrived at the *status quo ante* operation. Daunted but not despairing, Abadie determined to see what was going on at the seat of operation and again, along with Leriche, opened up the region of the carotid bifurcation. There was a dense cicatricial tissue around the bifurcation, and, in endeavouring once again to strip this off, the artery was wounded and the common carotid had to be tied. No bad symptoms developed, and, strange to say, improvement in the vision again took place, reached a certain point, and then again declined. Blindness eventually resulted. In three other cases, but more advanced than the one fully described, a similar operation was performed, with the addition of ligature of the external carotid with the view of increasing the nutrition of the optic nerve. All that Abadie says about these is that slight improvement took place. He does not mention whether it was maintained.

ERNEST THOMSON.

(5) **Aubineau, E. (Nantes).—Choice of operation in congenital ptosis—Technique of Hess's operation. (Choix d'une opération dans le "Ptosis congénital. Technique du procédé de Hess.")** *Annal. d'Ocul.*, Vol. CLVIII, March, 1921.

(5) In the present short paper **Aubineau** discusses the pros and cons of several of the ptosis operations and comes to the

conclusion that not only from the point of view of giving a good result when the eye is open and directed forwards, but from that of satisfactory voluntary occlusion, as well as during sleep, Hess's operation gives the best results and gives freedom from complications. In detailing the procedures in Hess's operation, he states that in infants there may be some difficulty at the operation in exactly locating the line of the eyebrow once this has been shaved. He illustrates the operation by four diagrams, and there are photographic reproductions of several cases before and after operation. He advocates local anaesthesia in all cases, except very young children.

W. C. SOUTER.

(6) **Bettremieux.—Operation on the fixing eye in strabismus.** **(Opération de l'oeil directeur dans le strabisme.)** *La Clin. Ophtal.*, June, 1921.

(6) **Bettremieux** as the result of his long experience, has come to the conclusion that it is wrong to operate on the squinting eye. "When the fixing eye is correctly operated on there is no change in the external appearance or motility of this eye, since the desire for sharp vision easily keeps it in correct position in all directions of fixation." The alteration of convergence innervation falls upon the squinting eye, and in a manner favourable to the cure of the squint. Bettremieux considers that from the theoretical point of view nothing better could happen. On the other hand, when we operate on the squinting eye we do not know exactly what we are doing and may cause over-correction. In young squinters, operation on the fixing eye gives the maximum of security against this. The author makes no special reference to the actual operation, whether tenotomy, advancement or combined.

ERNEST THOMSON.

(7) **Kleczkowski, F.—The application of the continuous suture in the operation of resection of the fornix conjunctivae.** **(Application de la suture continue dans l'opération de resection du fornix conjunctivae.)** *La Clin. Obhtal.*, May, 1922.

(7) **Kleczkowski** gives the history of this operation which, owing to its tendency to cause complete cicatricial atrophy of the superior fornix with consequent entropion, has been largely abandoned during the past 25 years. The author's experience is that this is quite unjust to the operation, which he has practised successfully for 20 years. The main point of the article is that it is necessary to obtain very accurate union of the conjunctival edges, that if this is obtained by interrupted suture the large

number of knots is a very great disadvantage, and that this disadvantage is abolished by the use of the continuous suture. The author uses no knots at all, leaving a long end at each extremity of the palpebral fissure.

ERNEST THOMSON.

(8) **Valois and Lemoine.—Remarks on lavage of the lens sac in the course of operation for cataract. Artificial re-formation of the anterior chamber. (Remarques relatives au lavage du sac cristallinien au cours de l'operation de la cataracte.)** *Annal. d'Ocul.* Vol. CLX, January, 1923.

(8) **Valcis and Lemoine** have already strongly advocated irrigation of the anterior chamber after extraction, and now they urge the advisability of using for the purpose an artificial aqueous humour made up to Mestrezat's formula to resemble as closely as possible normal aqueous. It is only in specially suitable cases, notably where the corneal incision has been easy and clean, and so the lips of the wound have come together well, that one gets this artificial re-formation of the anterior chamber but, when obtained, it leads to a more rapid cure, almost without reaction or post-operative pain. The authors discuss the various changes in the eye that have been noted after abstraction of the aqueous, and those in the aqueous that is then formed, to show how important it is to aim at an immediate restoration of the anterior chamber with artificially prepared normal aqueous used to irrigate the anterior chamber.

W. C. SOUTER.

(9) **Torok, Ervin (New York).—Iridectomy in glaucoma. A new technique.** *Arch. of Ophthal.*, November, 1923.

(9) **Torok** after stating that iridectomy is the safest operation in glaucoma proceeds to discuss the drawbacks to this operation in chronic glaucoma. The principal one is, of course, adhesion of the root of the iris to the posterior surface of the cornea, this adhesion not being broken down at the time of operation. In order to overcome this defect, he has worked out the following technique:—The eyeball is fixed with double fixation forceps in the limbus at the end of the horizontal meridian of the cornea. Incision is made with a Graefe knife, puncture and counter puncture in the sclera, the incision being behind the limbus with a conjunctival flap. This flap is then grasped with dissecting forceps and pulled forwards so that the wound gapes. With an iris spatula held in close contact with the sclera the root of the iris is detached throughout the whole length of the incision. Iris forceps are then introduced parallel with the wound, grasping the

iris near its root; they are drawn slightly forwards and downwards and the iris excised with two sweeps of the scissors held parallel with the wound. The operation has been performed during the last 18 months on 27 cases, and the results obtained are quite satisfactory.

F. A. WILLIAMSON-NOBLE.

VI.—DISEASES OF ORBIT

(1) **Knapp, Arnold (New York).—Orbital changes produced by radium in cancer of the upper jaw.** *Jl. Amer. Med. Assoc.*, December, 1923.

(1) **Knapp** records five cases of orbital derangement after radium treatment for malignant disease of the upper jaw, and concludes that the orbital involvement following the use of radium is quite different from that which is met with when radium has not been used. He finds that the swelling anteriorly, when radium has been applied, is different from the usual tumour growth and presents definite inflammatory symptoms, such as redness of the lids, with palpebral oedema, an involvement of the ocular muscles, especially of the inferior rectus, ciliary congestion, detachment of the retina and optic neuritis, A necrotic process may extend in the orbit to the eye, causing sloughing of the sclera and panophthalmitis. Infection is undoubtedly a factor and is especially liable to occur when radium is used near bone; this being easily devitalized, necrosis ensues, and infection cannot then be prevented. It has to be remembered that the effects of radium, viz., of the gamma rays, are long deferred, for weeks or even for months.

In view of the increasing use of radium in the treatment of malignant disease, the possible ulterior effects on the orbit and the eye should be borne in mind; they do not contraindicate the use of radium, as Knapp finds that the results of radium treatment combined with operation are better than those obtained by surgery alone.

R. R. J.

(2) **Chance, Burton (Philadelphia). —A case of cavernous angioma of the orbit.** *Trans. Amer. Ophthal. Soc.*, Vol. XXV, p. 226, October, 1917.

(2) A girl of sixteen years of age was affected with ptosis of one eye, and when the drooping lid was raised, a purplish mass, reminiscent of placental tissue, protruded through the palpebral fissure. The growth had been noticed soon after birth and had increased in size. It

extended from above the upper border of the internal rectus, near the cornea, over into the external rectus and forward into the lid. The great volume of the mass was accom modated by an absence of the orbital ridge in the middle third and by a hole in the external orbital wall, while on deep digital examination the roof of the orbit was found to be lacking in the middle portion. Approximate measurements of as much of the mass as could be seen, made while the girl lay flat on the bed, showed a circumference from the outer to the inner scleral border of 55 mm., directly across of 40 mm., antero-posteriorly 30 mm., and vertically 16 mm. Deep pressure on the jugulars increased the volume of the tumour, and pressure on the carotids diminished it. No pulsation or bruit was present. The tumour extended as far back as the anterior wall of the sphenoid, but was not connected with the frontal, maxillary, or sphenoid sinuses. Aspiration of the mass withdrew about 20 cc. of blood. A diagnosis of cavernous angioma was made. The growth was removed by dissection, and the conjunctiva which covered it was sutured. When examined microscopically, the tumour presented the characteristics of erectile tissue. A few weeks later, exuberant conjunctival granulations were snipped off and shortly after that tenotomy of the internal rectus was performed.

S.S.

(3) **Peters, Richard (Rostock).—Upon a case of bilateral encephalocele of the orbit. (Ueber einen Fall von doppelseitiger Encephalocele der Orbita.)** *Klin. Monatsbl. f. Augenheilk.*, Nov.-Dec., 1917.

(3) After a short summary of the recorded cases **Peters** describes his own. A male child, eight weeks old, showed at birth a small spherical tumour at the inner and upper aspect of each orbit. These tumours increased in size until eventually the left eye could not be seen. When examined the following condition was noted: on the right side below the lacrymal sac there was a fluctuating swelling the size of a pigeon's egg. The normal eye was pushed outwards and backwards. On the left side there was a tumour the size of a small apple which distended the lids and forced the eye forwards and outwards. On puncturing the tumours clear liquid escaped which contained a few red blood cells, some large round cells, and many lymphocytes. Albumen was present up to 20 on the Esbach scale, but no sugar. Three days later the child died of meningitis. The condition found at the post-mortem examination is described and illustrated by photographs.

The best account of these tumours has been given by Stedfeldt (Ueber die Enceph. der Orbita, *Nord. Med. Arch.* 24—1906) in a monograph which is quite unknown to ophthalmologists.

According to the situation, we can divide encephaloceles into occipital, sagittal, and sincipital. Rarely we find a basilar and lateral form. The sincipital are the commonest, followed closely by the occipital. The encephalocele escapes through a smooth-edged hole between two or three adjacent bones. Spring states that an encephalocele always passes through a defect in the bone itself and never through the sutures. The tumour is never a simple hernia with extension of the dura; the dura takes no share in forming the sac, but is merged into the bone at the edge of the opening, and only stretches for a short distance over the sac. The latter is covered by the thickened and cystic arachnoid, the subcutaneous tissue, and the skin. If brain tissue be present in the tumour, this is always connected by a canal with the ventricle. If actual brain tissue be absent, the inner surface of the sac is covered by a thin layer of nerve tissue. It is not certain whether the tumour formation or the bony defect is primary. In any case the disease commences before ossification of the membranous skull.

T. HARRISON BUTLER.

(4) **Orendorff, Otis (Canon City, Colo).—Successful removal of a bullet imbedded in the orbit ten years.** *Amer. Jl. of Ophthal.*, Series 3, Vol. I., No. 2, Feb., 1918.

(4) The operation for the removal of this bullet, 0.38 calibre, which had been lodged ten years in the orbit, was undertaken on account of constant headache and irritability of temper, with ptosis and convergent strabismus. Radiograms showed that the bullet, which had entered at the temple, had stopped at the upper part of the orbit about two-thirds of the way back from the margin. The bullet turned point downward and the upper part was embedded in the bone. An incision was made at the external orbital margin, similar to the anterior part of a Kronlein incision and the periosteum of the orbit was separated with nasal submucous elevators back towards the apex, keeping well in the superior part of the orbit. A solid bony obstruction was encountered above and to the nasal side and back of the eyeball. A Metzanbaum nasal retractor, which is soft and pliable, was shaped to conform to the eyeball, and the periosteum with the eyeball was drawn in and down and forward as far as possible, exposing the field "to a surprising extent." The bony obstruction was chiselled away leaving the bullet exposed. The latter was very tightly embedded, and the getting of it into position for removal was the only difficult part of the operation. There was prompt recovery with entire relief of pain, but the ptosis and squint persisted until relieved by operation later on. Regarding this operation the author says: "While it is hardly possible that so simple a method

of exposing the orbit for the removal of foreign bodies is original, I fail to find it recorded. If it should be considered too common to be worthy of a place in ophthalmic literature, I am certain that the use of a soft pliable retractor possesses wonderful advantages over any other kind, and this one feature alone is worthy of merit and justifies me in calling attention to it."

ERNEST THOMSON.

(5) **Benedict, William L., and Knight, Mary S. (Mayo Clinic).—Inflammatory pseudo-tumour of the orbit.** *Arch. of Ophthal.*, November, 1923.

(5) This condition according to **Drs. Benedict and Knight** would appear to be rare, only six cases having been reported since the publication of Birch-Hirschfeld's paper in 1910. It is characterized by limitation of mobility of the eye, proptosis, usually with lateral displacement, swelling of the lids and increase in the bulk of the retrobulbar tissues. Though focal infections can generally be found, the patient is not usually suffering from them and the absence of fever, leucocytosis and local pain differentiates the condition from the common inflammatory orbital processes.

There are six cases reported and in all of them the syndrome of benign or malignant tumour was present. Apart from pathological examination of the orbital contents, the differential diagnosis of pseudo from real tumour of the orbit would not seem possible. In one case, for instance, a radiograph of the orbit revealed destruction and some repair of bone in the region involved. Indeed the authors themselves state in the early part of their paper that the onset is slow, whereas later on, they say "the disease was sudden in onset or there was exacerbation of symptoms in most cases."

The aetiology of the condition is not known. Some cases may be due to recurrent haemorrhages of unknown origin stimulating the formation of fibrous tissue, and one of the reported cases agreed with this hypothesis.

In general, however, the findings were in accord with what one would expect in chronic inflammatory change. In the cases of long duration there was a ring of plasma cells and the tissue was studded with groups of lymphocytes resembling follicles. In cases where symptoms had been present a relatively short time, plasma cells were absent and polymorphonuclears with in some cases, eosinophiles, were present in considerable number.

The condition is possibly not so rare as the authors would think. The writer of this abstract had submitted to him a short time ago the contents of an orbit which had been exenterated under the impression that it contained a tumour. Pathological

examination failed to reveal any signs of a neoplasm, and demonstrated the presence of chronic inflammatory changes. In a second case where an eye was excised on account of a supposed intraocular tumour, the mass inside the eye was found to consist of a blood clot which had become largely organized into fibrous tissue. There was also an extraocular mass of fibrous tissue, formed in the same manner. Had this case been allowed to go on, it would have formed—in all probability—one of the haemorrhagic type of pseudo-tumour.

F. A. WILLIAMSON-NOBLE.

VII.—PERIMETRY AND VISUAL FIELDS

(1) **Walker, Clifford, B. (Boston).—Neurologic perimetry and a method of imitating daylight with electric illumination.** *Ophthal. Record*, December, 1917.

(1) **Walker,** of Boston, describes his somewhat elaborate arrangements for perimetry in his neurological clinic. The perimeter is suspended from a crane and can be moved vertically or horizontally, rotated and tilted to suit the requirements of a patient in bed or in a reclining or upright chair.

The illuminating device consisting of sixteen frosted electric light bulbs arranged in horseshoe form is hinged to a sliding sleeve on the upright portion of the crane and can also be raised or lowered and tilted so as to conform to the position of the patient and perimeter.

He has also devised a portable Bjerrum screen which is mounted on a frame made of 3/4 inch pipe having 18 inch projections at the bottom to give it a firm upright position. The same illuminating arrangement is used to light up the screen.

J. JAMESON EVANS.

(2) **Peter, Luther C. (Philadelphia, Pa.)—Artificial daylight illumination for perimetric study and general office use.** *Amer. Jl. of Ophthal.*, Series 3, Vol. I, No. 3, March, 1918.

(2) **Peter** first premises the advisability of obtaining a standard of illumination as near to daylight as possible. With this all will agree. The cost of installation of arrangements to give the nearest approach to daylight is an important item. An absorbing screen, from the standpoint of economy and efficiency, has proved the most practical method of obtaining artificial daylight. The author has been well satisfied with the Corning "Daylite" screen, made by

the Corning Glass Works, of Corning, N.Y. The only objection to the use of such screens is that the light furnishes only 15 per cent. of efficiency, the balance being absorbed by the filter which reduces the blue, red and yellow to normal daylight values.

ERNEST THOMSON.

(3) **Conlon, Frank A. (Lawrence, Mass.)—Bitemporal hemianopsia due to acute suppuration of the posterior nasal sinuses.** *Amer. Jl. of Ophthal.*, February, 1919.

(3) Conlon gives an account of a case of bitemporal hemianopsia in a man of 26. When first seen there was some swelling of both upper lids and tenderness on pressure of the left eyeball. Vision R. 20/30, L. 20/60. Right fundus normal, left disc slightly hyperaemic. No central scotoma. His previous history was unimportant and he had complained of headache for three days only. Rhinological examination showed a deviated septum with some enlargement of lower turbinates. Two days later there was an absolute central scotoma in the left eye and vision was only 2/60. The left disc was swollen 2 D. and the right disc looked a little engorged. The right field was full and vision normal. Radioscopy showed no affection of the sinuses. Three days later vision in right was only 6/200 and in left fingers at three feet. Operation was proposed but not accepted. During the following week the vision in both eyes fell to finger counting at two feet and both discs showed neuritis. Some pus was now found in left middle meatus. The nasal septum was now submucously resected and the posterior ethmoid and sphenoid exenterated. There was an acute inflammation of the cells on both sides. A fortnight later vision was 20/100 in each eye. The visual fields showed a typical bitemporal hemianopsia with the dividing line vertical. Ten days later the fields showed considerable improvement, the white field now showing only a large scotoma in connection with the blind spot, but colour perception was not recovered for several months and then was a little defective. Seven months later the vision in both eyes with correction was normal. The discs were then greyish white and the fields showed concentric contraction for white and colours with some enlargement of the blind spot.

As a bitemporal hemianopia of this type can only arise from a lesion of the chiasma the author points out that his case supports Traquair's views as to the correct anatomical position of the chiasma as opposed to the usual statement of the text books.

A bibliography of some value and illustrations of the field accompany the paper.

E. E. H.

(4) **Fradkine, S. (French Army).—Two cases of non-hysterical concentric contraction of the visual field. (Deux cas de rètrécissement concentrique du champ visuel non-hystériques.)** *La Clin. Ophtal.*, March, 1919.

(4) **Fradkine** draws attention to the necessity for not labelling as hysterical every case of concentric contraction of the fields without ocular lesion. He gives the histories of two cases in detail. The first case had apparently concentric contraction in one eye only and was soon proved to be a mere liar. When exposed he at once returned to his army work. The second case had bilateral concentric contraction with absolutely no fundus appearances to account for it. The man was not malingering, and could not be "caught out." He had symptoms of retinal asthenopia and was incapable of any sustained visual effort. All eye conditions to account for the symptoms having been investigated and ruled out, the patient was sent to the neuro-psychiatric department of the medical service. It was then reported after investigation of the urine, Wassermann test and examination of the cerebro-spinal fluid, that the patient was suffering from a chronic meningitic condition (*état méningé fruste*), of six months' duration, possibly due to influenza. After mentioning various theories as to how the meningeal affection acts in producing the symptoms in such cases as this, Fradkine supposes that sometimes a papillitis is produced and sometimes a simple compression and inhibition of certain fibres of the optic nerve not detectable with the ophthalmoscope. In the latter case it is not the retina but the conducting axis cylinder which is at fault. The diminution of visual acuity and the concentric contraction of the peripheral field constitute a sign of transitory papillary stasis dependent on the meningeal state.

ERNEST THOMSON.

(5) **Sauvineau, Charles (Paris).—The importance of the examination of the visual fields for the early diagnosis of tumours of the hypophysis. (Importance de l'examen du champ visuel pour le diagnostic précoce des tumeurs de l'hypophyse)** *La Clin. Ophtal.*, December, 1922.

(5) The title of **Sauvineau's** article gives principal place to early diagnosis of hypophyseal tumours, but the results of treatment by X-rays—not mentioned in the title—seem about equally important. The patient was an unmarried woman aged 40 years who consulted Chauvineau for almost complete loss of vision of the left eye. She made no complaint of the right eye and therefore there was nothing in her statement suggesting hemianopia. When Chauvineau found that there was optic atrophy (grey-white without signs of neuritis) of both eyes, that there was divergent strabismus of the left eye of

paralytic type and that, with this there was equality and activity of the pupils which pointed away from tabes: and when also the patient stated that for two months her hands and feet had been becoming thickened while her face had increased in size and that there was amenorrhoea, he expected to find bitemporal hemianopia, and he did, including the hemianopic pupil reaction. At this time the V.A. of the right eye was 4/10 and of the left 1/50. There was nothing further to note in the bodily or mental health and the Wassermann reaction was definitely negative. The patient was treated by pituitary extract for a month but the vision continued to fall. At this time radiography (which had been unavoidably delayed) revealed an enlarged sella turcica, the enlargement being especially in the antero-posterior direction. Radiotherapy was decided upon, one séance per week. At the end of seven weeks the vision had improved to R.E. 7/10; L.E. 1/37, and there was slight "recolouration" of the disc. Next, the catamenia reappeared and the face became smaller while the vision of right and left eyes improved to 8/10 and 1/25 respectively. This was at the end of 18 weeks and 18 séances. The patient felt solid on her feet and stated she had experienced a "resurrection." After 23 weeks and séances the visual fields had slightly enlarged. There were 27 X-ray séances in weekly series, after which they were stopped. Two years after the patient was first seen by Sauvineau the right V. was 8/10 and the left 1/37 but there was no change in the fields. The patient had recommenced her occupations. The X-ray treatment had caused no inconvenience other than a slight loss of hair at the temples.

Chauvineau's article is illustrated by a reproduction of the radiogram, and, in general, contains a full account of a very instructive case.

ERNEST THOMSON.

(6) **Uhthoff, Dr. W. (Breslau).—A case of binasal hemianopia. (Ueber einen Fall von binasaler Hemianopsie.)** *Klin. Monatsbl. f. Augenheilk.*, January-February, 1923.

(6) History, W. R., 30 years old, a miner. Good health previously. Headaches three months getting worse. Deterioration of vision in left eye for three weeks, and shortly after in the right eye.

Neurological Examination. Paresis of left 7th especially oral branch. Uncertain gait, and and positive Romberg sign. Slight tremor of hands, nothing else abnormal. Negative Wassermann, no sign of tuberculosis.

Ophthalmological Examination. Papilloedema both sides, swelling 3D, V. L.E.—fingers at 1/3 metre, V. R.E.—1/2.

Movements free, R.E.—proptosed 3mm. in front of L.E. Pupils show a hemianopic type of light reaction.

Fields, R.E. A semi-circular area of vision remains in the temporal half, the boundary of which is the 20° circle. The vertical dividing line is sharply marked off, and spreads only 2° to the inner side of the fixation point.

L.E. A similar but smaller semi-circle in the temporal half, bounded by the 10° circle and the vertical meridian. X-ray shows considerable widening of sella turcica.

Diagnosis. Tumour in region of hypophysis with proliferation into right orbit through the sphenoidal fissure. Forward growth of the tumour has pushed the chiasma forwards causing damage to its front portion and lateral angles, thus producing the field changes described.

F. A. WILLIAMSON-NOBLE.

BOOK NOTICES

Principles of Ophthalmoscopy and Skiascopy. By G. F. ALEXANDER, M.B., C.M. 72 pp., 30 illustrations. London: Published by J. & A. Churchill. 1923. Price, 5s.

In the preface Mr. Alexander tells us that he has made "simplicity the primary consideration," and nothing could be simpler than his method of obtaining the formula for refraction at a single spherical surface. It is all that is required for his purpose, and deserves the highest praise. But his use of symbols is confusing: the index of refraction is denoted by the usual symbol in the figures, but in the text it is denoted by u, which in mathematics is used for a variable such as a velocity; if Greek letters are shunned n is the symbol employed for this constant. On p. 2 the capital I is a point, the conjugate of the point O, but seven lines lower down I is the angle of incidence; small English letters c, d, and e denote other angles, yet o, i, and r are used for distances. There is no reason why the ordinary conventions prevalent in mathematical books should not be followed; it is usual to use Greek letters, or the first three or four English capital letters for angles, and p and q for the distances of the object and image to the principal plane. These points though trivial should be noted for later editions. No explanation of the difference between the first and second focal distances is given, and the number of formulae to be memorized is far too great.

It is most important to reduce this number as far as possible;

for the purposes of the greater part of this book only two are required, which are usually written :—

(1) $\frac{f'}{p}+\frac{f''}{q}=1$

$$\therefore\ q=\frac{pf''}{p-f'} \quad \text{and} \quad p=\frac{qf'}{q-f''}$$

(2) $$\frac{i}{o}=\frac{f'}{f'-p}=\frac{f''-q}{f''}$$

where i denotes the height of the image, and o the height of the object. From this we get at once

$$(f'-p)\ (f''-q)\ =f'\,f''.$$

All distances are measured towards their appropriate principal planes; for all converging systems f' is positive, and f'' is negative (except in reflexion when $f''=f'$), and vice versa for all diverging systems. The sign of q will show whether the image is on the positive or the negative side of the principal plane, and that of i will show whether the image is erect or inverted. These formulae are universally true for reflexion as well as refraction at spherical surfaces whether they be convex or concave.

The "scissors" movement seen sometimes in skiascopy is well described and its explanation is well illustrated by the figures given; indeed the last dozen pages give a far better account of paracentral shadows and other anomalies than has been published before.

Parenchymatous Keratitis: Interstitial Keratitis: Uveitis Anterior. By W. T. HOLMES SPICER. London: George Pulman & Sons, Ltd. pp. 63; 41 figures. 1924. Price 5s.

Greatly aided by his artist's pencil the author, in this monograph, has at an appropriate moment promoted the progress of ophthalmology. He has lucidly summarized our knowledge of parenchymatous keratitis, and added to it not a little from the rich store of clinical observation which he has personally accumulated. We feel that this is work so well done, that by our old clinical methods little is likely to be added, and that it is well it should have been done by such an expert and at a time when the use of the Slit Lamp and the Corneal Microscope hold out good hopes that further advance in knowledge may be made; the old ground has been re-dug, not without new revelations, and fertilized so that it is now in the best condition to bear new fruit. The subject is one which has at all times been left freely in the hands of the clinician; material for examination rarely finds its way into the pathologist's laboratory. The author, after a brief historical survey, discusses the sex and age incidence, basing his observations on the records of nearly 700 cases. The greater prevalence of interstitial keratitis

in females is indicated. The mode of onset is described, and it is pointed out that the preliminary stage may be much prolonged. A central form of invasion is found in 10 per cent. of cases, and may consist of an outpouring of leucocytes in the deeper corneal strata, or it is definitely endothelial with deposit of precipitates upon it—in the latter case, according to Leber, denudation of the endothelium may allow the aqueous to invade the cornea and set up cellular infiltration. Striate opacities from plication of Descemet's membrane are explained. Endothelial catarrh is described as a wave of opacity passing rapidly over the posterior surface of the cornea, and rapidly clearing.

The value and efficient use of fluorescein is described. Keratic Precipitates (k.p.) are discussed and abundantly illustrated. In the section on vascularization of the cornea the drawings show, admirably, features of great interest and diagnostic importance in all stages of development. Interstitial keratitis from acquired syphilis is recognised; the author's views as to its amenability to antispecific treatment would have been interesting; other alleged causes such as tubercle are reviewed by the author, who is scarcely prepared to admit them as the primary source of the corneal disorder. The influence of injury as an excitant cause is fully considered, and we are glad to see that in the present state of our knowledge it is rejected—in relation to this point, the author says "The conclusion seems inevitable; the interstitial keratitis depends on the presence in the eye of the organism of syphilis, the spirochaeta pallida, and on its readiness for evolution; if that organism be present, interstitial keratitis is practically certain to occur at some time. If the organism be present, but the required state of evolution be not reached, there will be no attack; if the required state be not reached in the two eyes simultaneously there will be an interval between the two eyes; if the state of evolution has been reached there will be an attack in the absence of any stimulus, and in spite of anything that can be done."

What is known pathologically and what has been discovered by experiment is duly set out. An interesting dissertation on the methods and value of treatment leads to the expected results. An allusion to keratitis profunda and disciform keratitis completes this valuable monograph.

Parenchymatous Keratitis. (Le Cheratiti Parenchimatose.) By Dr. ALFREDO ROSICA (Rome). Chieti, 1923.

This monograph on Interstitial Keratitis begins with an account of the various observations which preceeded the work of Hutchinson; it gives honour to Jacob, Dixon, George Critchett and Velpeau, and quotes the account by Mackenzie of scrofulous keratitis, which showed that the main clinical features of the disease were known

long before the work of Hutchinson. There follows an account from Hutchinson's paper in the *Ophthalmic Reports of Moorfields Hospital* of the manifestations of the disease, the early haziness of the cornea, the vascular invasion and the final resolution, together with the masterly and convincing proof of the association of the disease with certain peculiarities of the teeth, and with hereditary syphilis as its cause. The conditions that may be mistaken for interstitial keratitis are next described:—disciform, lattice, sclerosing, deep punctate, nodosa, marginal, traumatic, striated and other forms of keratitis.

It is interesting after this long interval to recall the intense opposition offered to the views of Hutchinson by a large section of his confréres. At the memorable meeting of the Société de Chirurgie in November, 1870, Hutchinson set forth, with great wealth of proof, his demonstration of the association of interstitial keratitis with hereditary syphilis. Panas, who was the leader of a large band of followers, took upon himself to proclaim the anathema of the official science of surgery against the heresy of the English surgeon. *Tantaene animis caelestibus irae.*

As a statement of his own position the author says:—"I am not extreme to the point of asserting that the interstitial keratitis of typical form is not to be met with except in those who are infected with hereditary syphilis, but I will not hide the fact that such is my conviction."

From the cases, more than 100 in number, which have been observed by him in Rome and other Italian towns, no less than 80 per cent. were due to congenital syphilis, and only two cases could be considered traumatic.

Tubercular parenchymatous keratitis is next described; the author considers it to be an alteration in the cornea secondary to inflammation of the iris or ciliary body rather than a primary affection, and much more serious in its results.

After giving an account of leprous interstitial keratitis, he passes to malarial keratitis, describes the evidence on which it is based and comes to the conclusion that keratitis attributed to malaria has an appearance and course different from that of syphilitic origin, being essentially uniocular, circumscribed and often avascular; and generally running a more rapid course.

Influenzal keratitis has been described by various authors, but from their description it is something quite different from true interstitial keratitis, being either some marginal form, or a disciform affection. The author mentions lymphatic or scrofulous keratitis, rheumatic, reflex, dysmenorrhoeic and traumatic, and thus concludes his survey of the literature.

Tables of statistics of various observers show the incidence of interstitial keratitis among patients attending the eye clinics; it varies between 0·3 and 1 per cent. The age incidence is next dealt

with, and the tables show that the age of greatest prevalence is about 15, and that there is a great preponderance of females over males in those attacked. The percentage of association with hereditary syphilis varies between 30 (Siklosoi) and 92.5 (Ayres and Bossi), and with acquired syphilis between 3 and 12.

Aetiology.—After giving at some length the views of Panas and Fournier, who considered the disease not as a direct manifestation of syphilis but simply as dyscrasic or parasyphilitic, the author passes to the evidence of the existence of the spirochaete within the cornea itself, and describes the observations of Morax, Stephenson, Greef and others, together with the experiments of Wagenmann in ligaturing the long posterior ciliary arteries and of Kester in ligaturing the venae vorticosae.

Histological reports by Virchow, Fuchs and Elschnig follow, and the author completes an excellent resumé of most of the thoughts and observations of writers from the time of Hutchinson till now. He concludes by saying: "notwithstanding diligent research and passionate discussion the question still remains for solution if interstitial keratitis is a degenerative process of trophic origin or a true manifestation of inflammation of the cornea."

Next follow the personal observations of the author, and a series of tables gives an account of 100 cases which have been carefully recorded and studied by him in the eye clinic of Rome.

Concluding Note.—After a consideration of the clinical observations, the results of serological and experimental investigations together with an examination of the various views of the aetiology and pathology of interstitial keratitis there emerges a typical form which differs in character from all other forms of interstitial infiltration of the cornea and which is always associated with syphilis, ordinarily hereditary, but sometimes acquired. It is intrinsically an inflammation of the corneal parenchyma with the characteristic stages of infiltration, vascularization, and resolution.

W. T. HOLMES SPICER.

OBITUARY

THOMAS BRITTIN ARCHER, 1846-1924

THE late Mr. Archer was the youngest child of the late Goodwyn Archer of Ely, Cambridgeshire. He was educated at "The King's School," Ely, and afterwards at the Grammar School, Ipswich. He was apprenticed in 1865 to the late Richard Jones, Medical Practitioner of Woodbridge, Suffolk, and from thence completed

his medical studies at St. Bartholomew's Hospital, obtaining the qualification of M.R.C.S.

When the first Ophthalmic Ward of St. Bartholomew's Hospital was opened in November, 1870, Mr. Archer was appointed Ophthalmic House Surgeon, and served for a year. Subsequently he visited in rotation the principal ophthalmic hospitals in Brussels, Berlin, and Vienna, for a period of nearly three years. On his return in 1873, he was appointed clinical assistant to the Central London Ophthalmic Hospital, and the Royal London Ophthalmic Hospital, and became surgeon to the former hospital in the same year. To this hospital he practically devoted all his energies for he neither cared for private practice nor sought after it. He became the senior surgeon in 1879, and from that time as Chairman of the Medical Committee did all in his power to increase the efficiency of the hospital both as regards its structure and personnel.

On retiring at the age limit of 65 in 1911, the members of the honorary staff and the committee presented him with a silver cup in recognition of his services, which he subsequently presented to the hospital as a Loving cup to be used at the Annual Dinner. About this time he gave up private practice entirely, and, became Chairman of the hospital at the most critical period of its history when its funds were at a low ebb and money had to be obtained to build a new institution. It is probable that if he had not come forward and filled the post of Chairman and Treasurer of the hospital at that time the new hospital would not have been built. During this time he attended the hospital daily, supervising the collection of the funds, etc.

On the outbreak of the War he once more became an active member of the staff helping daily to replace those members of the staff who had been called up on active service. To show the appreciation of his services the Committee of Management called one of the wards in the new hospital the "Archer Ward."

Although he was an original member of the Ophthalmological Society of the United Kingdom, in latter years he did not often attend its meetings, but he always carefully perused the contents of its Transactions from cover to cover. When in active practice he was always abreast of the times in his speciality. From time to time he gave most interesting clinical lectures at the hospital, but was adverse to their publication. He presented £100, the interest of which to form a prize for junior clinical assistants. In 1921, he resigned the Chairmanship of the hospital and retired into private life.

He died on January 24, 1924, of angina pectoris. He was fond of music and painting, and in his youth was an expert with both rod and gun. Under a somewhat critical manner he hid a generous, straightforward nature which endeared him to those who knew him well.

NOTES

Oxford Ophthalmological Congress

WE have much pleasure in announcing that SIR ANDERSON CRITCHETT, Bart., K.C.V.O., has been elected Master of the Oxford Ophthalmological Congress.

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Annual Congress of the French Ophthalmological Society

THE thirty-seventh Congress of the Société française d'Ophtalmologie will be held in Paris from the 12th to the 15th of May, 1924. The first day will be devoted to papers on refraction, the lids and lacrymal apparatus. There will also be a communication from Dr. de Schweinitz. The afternoon sitting will be devoted to a discussion on ocular troubles of dental origin by Dr. Camille Fromaget. The official banquet of the Congress will be held in the evening. On the remaining three days there will be numerous papers on various subjects of ophthalmic interest with morning visits to the hospitals.

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British Empire Cancer Campaign

A SCIENTIFIC Advisory Committee has been appointed as part of the organization of this campaign under the auspices of the British Red Cross Society. The names of those who have consented to serve are as follow:—Sir John Bland-Sutton, Dr. H. H. Dale, F.R.S., Sir Richard Garton, Dr. F. Gowland Hopkins, F.R.S., Dr. Robert Knox, Sir William Leishman, F.R.S., Professor C. J. Martin, F.R.S., Dr. Robert Muir, F.R.S., and Sir Humphry Rolleston. Its functions will be to devise schemes of research and to advise and report upon all questions relating to research including the allotment and application of funds.

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Gift of Ophthalmic Instruments

LADY TWEEDY has presented to the Museum of the Royal College of Surgeons some of the more interesting of the instruments of the late Sir John Tweedy, including his optometers first described in the *Lancet* in 1876.

FUTURE ARRANGEMENTS

April 1.—Midland Ophthalmological Society, at the Birmingham and Midland Eye Hospital.

May 1-3.—Annual Congress, Ophthalmological Society of the United Kingdom.

May 6.—Medical Faculty of Paris. Ophthalmological Clinic of the Hôtel-Dieu. Advanced Course (*Cours de Perfectionnement*).

Professor F. de Lapersonne, assisted by Doctors Velter, Hautant, Prelat and Cousin, will hold an advanced course, beginning on May 6, with clinical examinations, practical operative work, and laboratory manipulations.

Lessons and practical exercises will be arranged every day. A special certificate of the Faculty of Medicine of Paris will be issued at the end of the course.

French and foreign medical men and students who desire to attend should apply to the Secretariat of the Faculty of Medicine. The fee for the course has been fixed at 150 francs.

May 12.—Congrès de la Société française d'Ophtalmologie (Paris).

June 3.—Midland Ophthalmological Society, at the Coventry and Warwickshire Hospital.

June 13.—Royal Society of Medicine. Section of Ophthalmology (Annual Meeting).

July 2-5.—Oxford Ophthalmological Congress.

The Doyne Memorial Lecture will be delivered by Dr. T. Harrison Butler on "Focal illumination of the eye, with special reference to the clinical use of Gullstrand's Slit-Lamp." A Discussion will be held on "The general principles of the treatment of convergent concomitant strabismus" (excluding details of operations) to be opened by Dr. E. Landolt of Paris and Dr. Ernest Thomson of Stirling. A discussion on "Medico-legal Ophthalmology" will also be held.

July 22-25.—British Medical Association. Ninety-Second Annual Meeting at Bradford. Section of Ophthalmology. President: A. Maitland Ramsay, M.D.; Vice-Presidents: R. J. Coulter, M.B., G. H. Oliver, A. L. Whitehead, M.B.: Hon. Secretaries: J. D. McCulloch, M.B., Humphrey Neame.

September 1-6.—Course on the slit-lamp at the Ophthalmic Clinic of Zurich.

In answer to a number of applicants who could not be accommodated last year, Professor Vogt will hold a course in slit-lamp work, combined with demonstrations of the fundus in red-free light, from September 1 to 6, inclusive, 1924. The programme will be the same as that of last year. The number of students to be admitted to the course is limited.

Application should be made to Professor Vogt, Universitäts Augenklinik, Zurich.

October 7.—Midland Ophthalmological Society (Annual Meeting) at the Birmingham and Midland Eye Hospital.